THE IRON TRADE REVIEW

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GOOD WILL FOR ALL NATIONS

Encouraged by Meeting of American and Foreign Steel Makers---Conservative Policy in New Relations With Jobbers Expected

The meeting of the American Iron and Steel Institute and the visit of distinguished foreigners have aroused keen interest in the trade. Positive assurances were given the visitors that before their departures there would be furnished genuine evidence of the friendship of American manufacturers, but it is not expected that anything that could be construed as violating even the spirit of the anti-trust laws will be attempted. Much better international feeling and opposition to dumping on one country the products of another, with ruinous reductions of prices, will, however, be encouraged.

A New Policy

The action of the Carnegie Steel Co. in sending salesmen into central western territory to take orders for the Pittsburg warehouse will probably result in much closer relations of jobbers and independents, although some of the latter say they have not forgotten the partiality shown by the jobbers for years for the Steel Corporation. Some jobbers express the fear that they will not be able to get a full line of products without patronizing the Corporation, but most of them are confident that, after a short period of readjustment under rather severe conditions, they will be able to continue in business and enjoy as great prosperity as ever. It is expected that the Steel Corporation in following out its new policy, including the erection of warehouses in several western cities, will pursue its characteristically conservative policy and that there will be no disposition to resort to price cutting. The Corporation simply takes the position that, not wishing to crush anybody, it exercises its privilege of selling its own products from its own warehouses, instead of paying commissions to jobbers.

Pig Iron

Cast iron pipe interests have made purchases aggregating about 20,000 tons in eastern territory during the past ten days. The leading radiator interest, which has been in the market for 42,000 tons, has not yet purchased. The Grand Crossing Tack Co. has purchased 6,000 tons of basic, and a Milwaukee manufacturing concern has purchased 1,500 tons of southern foundry at $11.50, Birmingham, for delivery during the first half of the year. The sale of 6,000 tons of malleable in the Pittsburg district at $14, valley, for delivery throughout next year has attracted considerable attention.

Railroad Buying

Railroads are still buying sparingly, but the outlook for more liberal orders is encouraging. A western railroad has specified on 23,000 tons of rails on an order which has been held up for some time. A western trunk line is inquiring for 30,000 tons of open-hearth rails of which about one-half that amount will probably be placed very soon. A recent important export order, 6,000 tons of bridge work, was placed by the Honolulu Iron Works through a New York firm.

Cast Iron Pipe Prices

Recent keen competition in cast iron pipe has brought out some low prices, especially in connection with a contract for 5,600 tons for Detroit, awarded to the American Car & Foundry Co. It is understood that as low as $18 per ton, makers' plant, has been done. Kansas City, Kan., Kansas City, Mo., and Salt Lake City have placed pipe contracts amounting to 5,000 tons, while a number of eastern cities have awarded tonnages ranging from 400 to 900 tons.

Raising the Maine

One of the most interesting as well as novel adaptations to which sheet steel piling has yet been put is that for which an order for 5,000 tons has just been placed by the United States government with the Lackawanna Steel Co., for cofferdam construction in connection with the raising of the ill-fated Maine, in Havana harbor, as recently provided by act of Congress. The plan to be pursued is to surround the wreck with a cofferdam built of steel piling driven in large circles 40 to 50 feet in diameter, which will adjoin closely and which are to be backed where they are in contact by a single piling bar, rendering the enclosure perfectly watertight. About 20 of these circular forms will be required to complete the structure about the ship. The water within the cofferdam will be then pumped out and the wrecking crew will have complete access to the vessel lying in the mud of the harbor. The cofferdam, it is stated, will be the second largest ever built of sheet steel piling. That of the Black Run harbor improvement at Buffalo, constructed several years ago of Lackawanna piling, required about 7,000 tons. This structure was built in squares.

WORLD'S IRON MARKETS

PITTSBURG

Decided Gain in Bookings of Some Products—Low Pig Iron Price.

Office of THE IRON TRADE REVIEW,
Post Building, Oct. 18.

Developments during the past week in the local iron and steel market have been of an encouraging nature. Actual bookings of wire products, sheets, tin plate and pipe show a decided gain and prices of all classes of rolled products are being well maintained. In point of new business and specifications, the markets on wire products and sheets are making a better showing than at any time since July 1, although low quotations on sheets are still being made by some plants.

The rail specification committee representing the Pennsylvania railroad system lines both east and west of Pittsburg has been in session during the past week and it is expected that this company, as well as other large trunk lines, will take action in the immediate future regarding 1911 rail requirements. Some of the railroads are experiencing a car shortage and some fairly large awards may be expected shortly. The Norfolk & Western railroad will probably decide tomorrow whether it will build 500 all-steel gondolas at its own shops or award a contract for this equipment.

One of the important developments of the week was the action of the Carnegie Steel Co. in sending out about 20 salesmen to represent the company's new warehouse in Pittsburg. So far this action has caused little disturbance in the immediate Pittsburg district, as there are few large jobbing interests here. It is known, however, that some of the large jobbers west of Pittsburg are now arranging to line up with independents.

The principal transaction in the local pig iron market was the sale of 6,000 tons of malleable for delivery over all of 1911 at the low price of $14.90, delivered, or $14, valley furnace. This sale has attracted a great deal of attention, as the price is from 75 cents to $1 a ton below prices originally asked by sellers for delivery next year. The United Steel Co., Canton, O., is in the market for 3,000 tons of basic pig iron for first quarter delivery and other inquiries now pending involve from 5,000 to 6,000 tons additional. The coke market is quiet, most consumers being covered for early needs.

Orders for steel bars are chiefly for immediate shipment, indicating that stocks are very low. Prices are firm at 1.40c. Pittsburg. New business for semi-finished steel is mostly for small lots, although inquiry for open-hearth steel appears to be somewhat heavier.

Pig Iron.—There is more written inquiry for pig iron pending in this district and the market shows increased activity in the way of sales, but prices are low and in several instances furnace interests are not quoting on the small amount of new business appearing. The principal transaction of the week was the purchase of 6,000 tons of malleable and 3,000 tons of warm blast charcoal iron by the Pittsburg Malleable Iron Co., Pittsburg, for delivery over the 12 months beginning Jan. 1. This is the first sale of pig iron in this market for delivery over all of 1911, and the above sale of malleable established a low price of $14.90, delivered, or $14, valley. The transaction involved two lots of 3,000 tons each. Another sale of 2,500 tons of warm blast charcoal iron for delivery east of Pittsburg is noted. Odd lots of malleable for early shipment have been sold at from $13.50 to $13.65, valley.

The United Steel Co., Canton, O., is in the market for 3,000 tons of basic for first quarter delivery and other inquiries for fourth and first quarter shipment involve from 5,000 to 6,000 tons. A local steel company is reported to have closed recently for 2,000 tons of basic, but the report has not been confirmed. A sale of 1,000 tons at $13.25, valley, is noted, but some special terms are involved in this transaction. Basic iron has sold as low as $13, valley, for prompt shipment, and additional iron probably could be picked up at this figure.

The Standard Sanitary Mfg. Co., Pittsburg, has closed for 1,000 tons of southern iron for delivery at Louisville, Ky., on a basis of $11, Birmingham, and has practically closed for 2000 tons of No. 2 northern foundry iron for delivery at New Brighton, Pa., and Northside, Pittsburg. A local consumer has closed for 1,000 tons of No. 2 foundry, November and December shipment, at $14, valley.

There has been little trading in Bessemer, and, while it is reported that $15, valley, could be shaded, there has not been enough trading to test the market. Local furnaces are not quoting below that figure. There is only scattered inquiry for gray forge iron and no sales have been reported. We quote the market as follows:

Pig Iron Prices.

(Prompt Shipment.)

Bessemer, valley	$15.00
Bessemer, Pittsburg	15.90
Basic, valley	13.00
Basic, Pittsburg	13.90
No. 2 foundry, Pittsburg	14.90
Gray forge, Pittsburg	14.15
Malleable, Pittsburg	14.40

(First Quarter.)

Bessemer, valley	$15.00
Bessemer, Pittsburg	15.90
Basic, valley	13.50
Basic, Pittsburg	14.40
No. 2 foundry, Pittsburg	15.40
Gray forge, Pittsburg	14.65
Malleable, Pittsburg	14.90

Ferro-Alloys.—Aside from a few scattered sales of ferro-manganese on a basis of $39, Baltimore, for fourth quarter and first half shipment, there is little activity in this market. Users of 50 per cent ferro-silicon are covered for their early needs and few sales are reported. Demand for domestic ferro-silicon continues heavy.

We quote ferro-manganese at $39, Baltimore, for fourth quarter of 1910 and first quarter of 1911. The freight rate from Baltimore to Pittsburg is $1.95 per ton.

Fifty per cent ferro-silicon is quoted at $55 to $55.50, Pittsburg; domestic, 12 per cent, $25; 11 per cent, $24; 10 per cent, $23, f. o. b. Jisco and Ashland furnaces. The freight rate to Pittsburg is $1.90. The foreign grades are held at $1 or more a ton over domestic prices.

Plates.—No large awards for plates have been made in this district and total bookings for the past week have been very light. Some of the steel companies still have fairly heavy ton-

nage on their books and report that specifications are coming in at about the same rate as last month. While a few of the independents have been obliged to cut down production, one or two mills have been closed during the week. The Norfolk & Western Railroad Co. will probably take definite action tomorrow regarding the contract for 500 all-steel gondolas. Local car builders and manufacturers of plates are more optimistic this week regarding the outlook for the future and expect some fairly large awards for cars in the near future. Prices apparently are firm with 1.40c, Pittsburg, as the minimum. We quote the market as follows:

Tank plates, ¼ inch thick, 6¼ to 100 inches, 1.40c. Extras are as follows, per 100 pounds: Boiler and flange steel plates, 0.10c; A. B. M. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.20c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ¼ inch to and including 3-16 inch plate on thin edge, 0.10c; under 3-16 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms net cash in 30 days.

Sheets.—Manufacturers of sheets are more optimistic than at any time since July 1 and new business is heavier than at any time during the third quarter. In several instances, however, low prices are still being made and all new business is for early shipment, manufacturers refusing to sell far ahead at prevailing prices. Specifications are slightly heavier and most of the plants are assured steady operation until the first of the year. Present sheet prices, Pittsburg base, are nominally as follows, with $1 a ton added as the delivered price in the Pittsburg district:

Blue annealed sheets, Nos. 3 to 8, 1.55c to 1.60c; Nos. 9 and 10, 1.60c to 1.65c; Nos. 11 and 12, 1.65c to 1.70c; Nos. 13 and 14, 1.70c to 1.75c; Nos. 15 and 16, 1.80c to 1.85c; box annealed sheets, Nos. 10 and 12, 1.80c to 1.85c; Nos. 13 and 14, 1.85c to 1.90c; Nos. 15 and 16, 1.90c to 1.95c; Nos. 17 to 21, 1.95c to 2c; Nos. 22 to 24, 2c to 2.05c; Nos. 25 and 26, 2.05c to 2.10c; No. 27, 2.10c to 2.15c; No. 28, 2.15c to 2.20c; No. 29, 2.20c to 2.25c; No. 30, 2.25c to 2.30c; galvanized sheets, No. 14, 2.30c to 2.35c; Nos. 15, 16 and 17, 2.45c to 2.50c; Nos. 18 to 22, 2.60c to 2.65c; No. 24, 2.70c to 2.75c; No. 26, 2.90c to 2.95c; No. 27, 3.05c to 3.10c; No. 28, 3.20c to 3.25c; No. 29, 3.30c to 3.35c; No. 30, 3.50c to 3.55c; painted roofing sheets, $1.55 to $1.60 per square for No. 28 gage, 2½ inch corrugation, and galvanized roofing sheets, $2.75 to $2.80 per square for No. 28 gage, 2½ inch corrugation.

Tin Plate.—There is only moderate buying of tin plate for November and December shipment, but several independent manufacturers are accepting contracts for delivery over the first quarter of 1911 at prevailing prices. Some of the tin mills in this section have enough business on their books to insure steady operation until Jan. 1, while others are expected to curtail production somewhat the latter part of next month. Prices are firm. The receiver of the Union Sheet & Tin Plate Co. has leased the Marietta, O., plant to the Cincinnati Iron & Steel Co., Cincinnati, O., for a period of three months. The plant will be placed in operation probably next week. The base price on tin plate is as follows:

Coke tin plate, 10-pound basis, 14 x 20, $3.60, f. o. b. mill, Pittsburg district.

Rails and Track Material.—No orders have been placed as yet for standard rails for 1911 delivery and this market is not showing a great deal of life in the way of new business, as most of the roads which draw their rail supply from this district have covered for their 1910 requirements. The large trunk lines, however, are specifying freely against contracts previously placed and local mills are operating on about the same basis as last month. Demand for light rails is fairly heavy and this market shows little change from a week ago in point of new business and specifications. Some of the trunk lines are buying spikes in larger lots and sales of track bolts are slightly heavier. We quote the market as follows, the base price on open-hearth rails being $30, mill:

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails on base weight of 40 to 45 pounds, $26.50 to $27, the schedule on the other weights being irregular and subject to negotiations; angle splice bars for standard sections, 1.50c, Pittsburg; standard spikes, 1.55c to 1.60c, Pittsburg; hand spikes, 1.65c to 1.70c, Pittsburg; track bolts, 2.30c, Pittsburg.

Steel.—Users of semi-finished steel are confining their purchases to urgent needs, and actual bookings during the past week have been comparatively light. The sale of from 20,000 to 25,000 tons of Bessemer billets to a western consumer by a valley interest for October, November and December shipment is the largest transaction in this district for some time. Prices show little change from a week ago, and Bessemer and open-hearth sheet bars are still quotable at $25, makers' mill. In some sections, there is heavier inquiry for open-hearth steel. Bessemer billets are being sold on a basis of $24, makers' mill, and open-hearth billets are quotable at $1 a ton higher. We quote the market as follows:

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $24, Pittsburg, with the usual extras for size and analysis, and open-hearth rolling billets, $24.50 to $25, Pittsburg. Forging billets are quotable at $29, Pittsburg. Bessemer sheet and tin bars are quoted at $25, and open-hearth sheet bars are quoted at $25, makers' mill, located within the $1, Pittsburg, freight limits.

Hoops and Bands.—Moderate buying of hoops and bands for early shipment is noted, total bookings so far this month showing a slight gain over the corresponding period of September. Users are specifying freely, and local mills are running full time. We quote the market as follows:

Hoops in carload lots, 1.50c; in less than carload lots, 1.65c; bands, 1.40c, base, with net extras, as per standard steel.

Merchant Bars.—Demand for steel bars for early shipment shows a slight improvement and prices are firm with 1.40c, Pittsburg, as the minimum. Makers are not selling very far ahead at present prices. That stocks are very low is indicated by the fact that a difference of one or two days in promised deliveries is having a great deal to do with the placing of new orders. The mills which promise to make deliveries within a week usually get the business. Buying of bar iron is more general, but the total tonnage involved in sales during the past week is not very heavy. The last of the strikes of the Sons of Vulcan was called off Monday of this week, when about 200 members of this organization were given employment at the McKees Rocks, Pa., plant of the Lockhart Iron & Steel Co. This company is also employing about 75 members of the Amalgamated Association of Iron, Steel and Tin Workers. We quote the market as follows:

Common iron bars, 1.40c to 1.50c, Pittsburg; Bessemer and open-hearth steel bars, 1.40c to 1.45c; plow and cultivator, 1.40c to 1.45c; channels, angles, zees, tees, under 3-inch, 1.50c to 1.55c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds of a size, 0.35c advance. Cold rolled and ground shafting, 55 per cent in carloads and 50 per cent in less than carloads, delivered in base territory.

Structural.—Inquiries noted in this market recently are still pending. The volume of business entered during the past week has been comparatively small. Some of the local steel plants have comparatively little structural tonnage on their books, and a further curtailment in output is expected. Local fabricators are still running their shops on a fairly satisfactory basis. No large awards have been made in this market and small awards are not as numerous as a few weeks ago.

Competition among fabricators is still very keen, and extremely low bids have been made on the small amount of new work appearing. We quote the market as follows:

Beams and channels, 15 inches and under, 1.40c; over 15 inches, 1.50c; zees, 1.40c; tees, 1.45c; angles, from 3 to 6 inches, 1.40c; over 6 inches, 1.50c; universal and sheared plates, 6¼ inches wide and wider, 1.40c.

Merchant Pipe.—Manufacturers of iron and steel pipe report slightly heavier bookings this month than in September. This increase is due largely to heavier buying on the part of consumers, as jobbers are not increasing their stocks to any great extent. Manufacturers are not quoting below prices announced on the new cards put out recently, and the outlook for the future is decidedly brighter. Heavy tonnage of large pipe is involved in inquiries pending in this market, and the indications are that some large awards will be made shortly. Steady operation of most of the pipe mills in this section for the next few months is assured as a result of the increased buying during the past month. We quote the following official discounts in carload lots, subject to the usual preferential discount to the larger buyers, merchant pipe, where specified, being offered in from ⅛ to 6 inches:

Steel Pipe Basing Price.

	Butt.		Lap.	
	Black.	Galv.	Black.	Galv.
⅛, ¼, ⅜ inch.....	72	58	..	..
½ inch	75	63	..	..
¾ to 1½ inch	79	69	..	..
2 to 3 inches.....	80	70	..	..
2 inches	..	..	76	66
2½ to 4 inches.....	..	..	78	68
4½ to 6 inches.....	..	..	77	67
7 to 12 inches.....	..	..	75	59
13 to 15 inches.....	..	..	51½	..

Plugged and reamed pipe is furnished at 2 points higher price, either butt or lap weld.

EXTRA STRONG PLAIN ENDS.

	Butt.		Lap.	
	Black.	Galv.	Black.	Galv.
⅛, ¼, ⅜ inch.....	69	59	..	..
½ inch	74	68	..	..
¾ to 1½ inch.....	78	72	..	..
2 to 3 inches	79	73	..	..
2 inches	..	..	75	69
2½ to 4 inches	..	..	77	71
4½ to 6 inches	..	..	76	70
7 to 8 inches	..	..	69	59
9 to 12 inches	..	..	64	54

DOUBLE EXTRA STRONG PLAIN ENDS.

½ inch	64	58	..	..
¾ to 1½ inch	67	61	..	..
2 to 3 inches	69	63	..	..
2 inches	..	..	65	59
2½ to 4 inches.....	..	..	67	61
4½ to 6 inches	..	..	66	60
7 to 8 inches.....	..	..	59	49

The card on iron pipe throughout carries four points lower discount than steel pipe.

Boiler Tubes.—Specifications against contracts for merchant and locomotive boiler tubes are fairly heavy, but there is not a great deal of new business developing. Production is about the same as last month, and prices are firm. We quote the market as follows:

	Steel.	Iron.
1 to 1½ inch	49	43
1¾ to 2¼ inch	61	43
2½ inch	63	48
2¾ to 5 inch	69	55
6 to 13 inch	60	43

2½ inch and smaller, over 18 feet, 10 per cent net extra.

2¾ inch and larger, over 22 feet, 10 per cent net extra.

To destination east of the Mississippi river will be sold at delivered discount for carloads lowered by two points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburg.

Wire Products.—Demand for wire and nails at present is heavier than in August and September, which were exceedingly good months when compared with corresponding periods earlier in the year. The increased buying is due largely to the fact that farmers are now taking up a large portion of the work which was held over last spring. Some of the independent mills which were running single turn a few months ago are now running full time day and night, and have more business on their books than for several months. Prices are firm. It is announced that the South Sharon, Pa., mills of the American Steel & Wire Co., which heretofore have been under the jurisdiction of the Cleveland district office of that company, have been placed under the jurisdiction of the Pittsburg district office, effective Oct. 15. We quote the market as follows:

Wire nails, jobbers' carload lots, $1.70; retailers' carload lots, $1.75; cut nails, jobbers' carload lots, $1.65; painted barb wire, jobbers' carload lots, $1.70; retailers' carload lots, $1.75, with 30c for galvanizing; plain wire to jobbers in carloads, $1.50, and to dealers, in carloads, $1.55; polished staples, $1.70; galvanized staples, $2.

Wire Rods.—There has been a decided improvement in the market on wire rods. Prices are from 50 cents to $1 a ton higher than a month ago; actual bookings are heavier, and consumers are specifying freely against contracts previously placed. Some makers who recently withdrew their quotation of $28, Pittsburg, have also withdrawn the quotation of $28.50, Pittsburg, and are now quoting $29, Pittsburg, as the minimum. We quote $28.50 to $29, Pittsburg, on Bessemer and open-hearth rods.

Coke.—Scattered inquiries for furnace and foundry coke for delivery beyond Jan. 1 are appearing, but sellers and consumers have not agreed upon prices for next year's delivery, and there has been no trading in this market for 1911 shipment. Consumers of both furnace and foundry coke are covered for their requirements over the remainder of this year, and as a result there is comparatively little activity in the market at present. Shipments are somewhat heavier, and production is about equal to consumption. Prices appear to be holding firm with $1.60, ovens, as the minimum on prompt furnace coke. The Baltimore & Ohio Railroad Co. has renewed its contract for fuel coke for a period of one year, aggregating about 55,000 tons. The Connellsville coke region is running about two-thirds of its theoretical capacity and about three-fourths of its practical capacity. The year started out with a production of from 450,000 to 475,000 tons weekly, which then dropped down gradually until May, when it had fallen to about 400,000 tons. In this neighborhood, it continued until about August, when it suddenly fell 50,000 tons. In the meantime active ovens were cut from 36,000 to 27,000. We quote standard Connellsville furnace coke for prompt shipment at $1.60, ovens, and on contract, at from $1.70 to $1.75, ovens. On high grade Connellsville foundry coke, we quote from $2.10 to $2.25, ovens, for prompt delivery; on contracts, from $2.25 to $2.50, ovens. The Connellsville *Courier's* figures for the week ending Oct. 8, show 27,558 active ovens with an output of 350,315 tons, compared with 27,255 active ovens and a production of 345,390 tons the previous week.

Old Material.—Consumers of scrap continue to buy in small lots for early shipment and usually at low prices. The market appears to have lost all the ground gained last month, and price concessions on several grades are reported. While there has not been enough trading during the past week thoroughly to test the market, it is not believed that the minimum quotations given below could be shaded. Stocks at furnaces are still very low, and consumers are not inclined to buy very far ahead. We quote, gross tons, delivered in the Pittsburg district, including Monessen, Sharon, Steubenville, Brackenridge and Follansbee, as follows:

Heavy melting scrap	$14.00 to 14.50
Rerolling rails	15.00 to 15.50
Bundled sheet scrap	10.50 to 11.00
Iron axles	24.00 to 24.50
Old iron rails	15.00 to 15.50
No. 1 wrought scrap	14.50 to 15.00
Old car wheels	13.50 to 14.00
Low phosphorus	17.50 to 18.00
Machine shop turnings	8.50 to 9.00
Cast borings	8.00 to 8.25
No. 1 cast scrap	14.00 to 14.25
Malleable	14.00 to 14.50
Stove plate	11.00 to 11.50

Encouraging Business in Rails—Pig Iron Not Active.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, Oct. 18.

Liberal specifications against old rail orders and considerable new business in standard rails in prospect are the most important features in the Chicago market this week. A strong spirit of optimism and hopefulness is evident. In general, a stronger tone

in finished lines continues to be noticeable, and the pig iron market remains comparatively inactive. The action of the Corporation in recently putting salesmen on the road to get business heretofore handled largely through the jobbing interests, has not aroused a great deal of interest in the local market. Most of the jobbers in this district express ability to take care of their own interests. The recent action is viewed as a part of a general policy, which is being developed to deal as far as possible with the ultimate consumer, without the intervention of jobbers. Apparently few of the salesmen have penetrated as yet into the immediate Chicago or Illinois territory.

Pig Iron.—New business in pig iron is still light and the market displays very little change since last week. Inquiries, however, seem to be a little better, although the developments are not such as to cause any thought of an active market in the immediate future. What activity there is in pig iron is confined largely to northern iron and mostly to basic. The Grand Crossing Tack Co. has closed for 6,000 tons for delivery during the last quarter and first quarter. It is understood that this business has gone to a local furnace. A foundry in Wisconsin has closed for 500 tons of Northern foundry iron for immediate delivery, at $16.00 Chicago. The Rundle Mfg. Co., Milwaukee, has purchased 1,500 tons of Sloss iron for delivery over the first half, at $11.50, Birmingham.

We quote the market f. o. b. Chicago, as follows:

(This year's delivery.)

Lake Superior charcoal	$18.00 to 18.50
Northern foundry No. 2	16.00 to 16.50
Southern foundry No. 2	15.35 to 15.85
Southern silveries, 5 per cent silicon	16.85 to 17.35
Jackson Co silveries, 8 per cent.	19.40
Malleable Bessemer	16.00 to 16.50
Alabama basic	15.35 to 15.85

(First quarter delivery.)

Lake Superior charcoal	18.50 to 19.00
Northern foundry No. 2	16.50 to 17.00
Southern foundry No. 2	15.85 to 16.35
Southern silveries, 5 per cent silicon	17.35 to 17.85
Jackson Co. silveries, 8 per cent.	....
Malleable Bessemer	16.50 to 17.00
Alabama basic	15.85 to 16.35

Billets.—Current business in billets continues very light and prices are merely nominal; open-hearth forging billets being quotable f. o. b. Chicago, $28.00 to $29.00.

Merchant Bars.—The iron bar business shows slight improvement; not enough, however, to cause any particular excitement in the trade, but sufficient to produce more confidence in the future. Specifications on steel bars continue to come in at a fairly good rate, but new business remains light. Buying of reinforcing steel is falling off to some extent, but this movement is seasonable on account of the approach of cold weather, which will curtail concrete work to a considerable extent.

We quote for Chicago delivery as follows:

Bar iron, 1.35c to 1.40c; hard steel bars, re-rolled, 1.45c to 1.55c; soft steel bars and bands and small shapes, 1.58c to 1.63c, base; hoops, 1.73c to 1.83c; planished or smooth finished tire steel, 1.78c to 1.83c, base; iron finished tire steel, 1.73c, base; smooth finished machinery steel, 1 inch and larger, 2.43c; spring steel, 2.28c; crucible spring steel, 2.78c; tool steel, 7c to 9c, with higher prices for special grades. Quotations on shafting are 55 per cent off the list for carload lots, and 50 per cent off for less than carload lots, carload freight alowed to points in base territory.

On iron and steel from local stock, we quote, as follows:

Bar iron, 1.80c to 1.90c, base; soft steel bars, 1.80c to 1.90c per 100 pounds, base; soft steel hoops, 2.10c to 2.20c, full extras.

Structural Material. — In spite of very light business reported this week, the feeling among structural interests is optimistic and the placing of large tonnages in the future is confidently expected. The Monroe Street bridge at Spokane, Wash., 500 tons, will be erected by the King Bridge Co., Cleveland. Vierling-McDowell & Co., Chicago, have taken a contract for new shops of the Western Electric Co., at Hawthorne, Ill., which will require 1,350 tons. The Oregon Trunk Railway expects to be in the market for 2,000 tons of additional bridge material in the near future. Arrangements have been made for widening the Chicago river to 200 feet as far south as Van Buren street and work on this project has commenced. This will necessitate rebuilding several bridges across the Chicago river, including the Van Buren street bridge, the Metropolitan Elevated Railroad bridge at Quincy street, and also the Jackson boulevard and Adams street bridges. The additional material required will amount to about 3,400 tons altogether. The work will be in charge of the sanitary district of Chicago. The volume of small orders in structural lines continues very encouraging.

We quote mill prices for structural shapes, Chicago delivery as follows:

Beams and channels, 15 inches and under, 1.58c to 1.63c. For extras, see Pittsburg report.

We quote local store prices as follows:

All angles, 3 inches and larger, including 6 inches, $1.80 to $1.90 per 100 pounds; angles over 6 inches, $1.90 to $2 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $1.80 per 100 pounds, base; channels, 3 inches and larger, $1.80 per 100 pounds, base.

Rails and Track Supplies.—The railroads continue to put out feelers and the present indications are that heavy buying is not very far away. A western railroad has specified on 23,000 tons of standard rails which have been held up since August, and also for a considerable tonnage of special track fastenings. This material will be rolled by the leading interest. A trunk line is figuring on 30,000 tons of open-hearth standard rails for immediate shipment and it is expected that at least 15,000 tons of this business will be placed very shortly. Small orders for rails are fair, the aggregate received by the local mills last week amounting to about 6,000 tons. Signs of improvement in the rail business are becoming more pronounced.

See Pittsburg report for prices on standard sections:

On light rails for Chicago delivery, we quote as follows:

Light rails, 35, 40 and 45-pound, $26; 16, 20, 25 and 30-pound, $27; 12-pound, $28.

Light section relayers, 45 pounds and under, subject to inspection, $21 to $23; standard section re-laying rails, subject to inspection, $23.50 to $24.

Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; railroad spikes, 1.70c to 1.75c; smaller size spikes, 1.75c, base; track bolts with square nuts, 2.25c to 2.30c, base.

Plates.—The plate market remains very quiet, although the local mills manage to keep running at a fair gait. There is some price shading, but in general the market is fairly well maintained. Local interests are figuring on some eastern car orders, including 500 steel underframe box cars and 500 all-steel hopper cars for the D., L. & W.; 500 all-steel hopper cars for the Norfolk & Western; 500 steel underframe box cars for the Boston & Maine.

We quote, Chicago delivery, as follows:

Tank plates, ¼ inch thick, 6¼ to 100 inches, 1.58c to 1.63c. For extras, see Pittsburg report.

Store prices are as follows, f. o. b. Chicago:

Tank steel, ¼ inch and heavier, up to 72 inches wide, 1.80c to 1.90c; from 72 inches to 96 inches wide, 1.90c to 2c; 3-16 inch up to and including 60 inches wide, 1.90c to 2c; 72 inches, 2.15c to 2.25c; No. 8, up to 60 inches wide, 1.95c to 9.05c. Flange quality and heads, 25c extra.

Sheets.—The sheet business continues to make a good showing. Orders for immediate shipment are sufficient to keep the local mills operating at a fairly satisfactory rate. There is some speculation among the sheet interests as to whether the Corporation's policy regarding bars, structurals, etc., in relation to the jobbing trade will be extended to include sheets.

For mill prices, see Pittsburg report. Freight to Chicago, 18 cents.

We quote store prices at Chicago, as follows:

Blue annealed sheets, Nos. 3 to 8, 1.73c to 1.78c; Nos. 9 and 10, 1.78c to 1.83c; No. 28 Box annealed, 2.33c to 2.38c; No. 28 Galvanized, 3.38c to 3.43c.

Wire Products.—A very heavy cereal crop places the farmers in a very comfortable position with the result that the demand for agricultural wire is very satisfactory and shows no signs of falling off. Fencing and barb wire are particularly active.

We quote, Chicago delivery, as follows:

Wire nails, jobbers' carload lots, $1.88; retailers' carload lots, $1.93; retailers' less than carload lots, $2.03; painted barb wire, jobbers' carload lots, $1.88; retailers' carload lots, $1.93; retailers' less than carload lots, $2.03; with 30c for galvanizing; plain wire to jobbers, $1.68; plain wire, retailers' carload lots, $1.73; staples, bright, $1.88.

Merchant Pipe and Tubes.—Jobbers report a very good business at present, although it is expected that the activity will slacken somewhat as the cold weather sets in. At present there is a good deal of building going on which consumes large quantities of the common sizes of merchant pipe. An encouraging demand is also noted for extra heavy high pressure steam pipe. Chicago jobbers have issued revised discounts out of stock on wrought iron pipe to conform with the changes in mill prices announced last week.

We quote iron and steel pipe out of stock, as follows:

Steel Pipe Basing Price.

STANDARD.

Size.	Black.	Galv.
⅛-¼-⅜ inch	68.2	53.2
½ inch	71.2	58 2
2-3 inch	76.2	65.2
4½-6 inch	73.2	62.2
7-12 inch	70.2	53.2

EXTRA STRONG PIPE, PLAIN END.

½ inch	69.2	62.2
2-3 inch	74.2	67.2
7-8 inch	64.2	....

DOUBLE EXTRA STRONG.

½ inch	57.2	49.2
2-3 inch	62.2	54.2
7-8 inch	52.2	40.2

STANDARD WROUGHT IRON PIPE.

Size.	Black.	Galv.
⅛-⅜ inch	62.2	47.2
½ inch	65.2	52.2
¼-1½ inch	70.2	59.2
2-3 inch butt	71.2	60.2
7-12 inch	66.2	49.2

Cast Iron Pipe.—The cast iron pipe market remains quite featureless. The routine orders are quite satisfactory and the aggregate of current business is reasonably good. We continue to quote, f. o. b. Chicago, as follows:

Four-inch water pipe, $27; 6 to 12 inches, $26; larger sizes, $25; gas pipe, $1 a ton higher.

Old Material.—The market is comparatively inactive. Melters are not eager to buy and declines of from 25c to 50c a ton are noted generally throughout the list. The various holidays last week were an added feature inducing quiet in the scrap market.

We quote the market f. o. b. Chicago, as follows:

GROSS TONS.

Old car wheels	$13.50 to 14.00
Old iron rails	16.00 to 16.50
Rerolling rails (5 ft. and over)	15.75 to 16.25
Old steel rails (3 ft. and under)	13.25 to 13.75
Frogs, switches and guards	12.25 to 12.75
Heavy melting steel	12.25 to 12.75
Shoveling steel	11.75 to 12.25

NET TONS.

No. 1 R. R. wrought	$11.50 to 11.75
No. 2 R. R. wrought	10.50 to 11.00
Arch bars and transoms	14.50 to 15.00
Knuckles, couplers and springs	11.25 to 11.75
Shafting	16.50 to 17.00
Iron car axles	19.00 to 19.25
Steel car axles	19.00 to 19.25
Locomotive tires	16.00 to 16.50
Dealers' forge	10.50 to 11.00
Pipes and flues	8.50 to 9.00
No. 1 cast, 150 lbs. and less	12.00 to 12.50
No. 1 busheling	9.50 to 10.00
No. 2 busheling	7.75 to 8.00
No. 1 boiler cut	8.75 to 9.25
Boiler punchings	14.25 to 14.75
Cast and mixed borings	4.50 to 5.00
Machine shop turnings	7.00 to 7.50
Railroad malleable	11.00 to 11.50
Agricultural malleable	10.25 to 10.75
Stove plate and light cast scrap	11.00 to 11.50
Angle bars, splices, etc. (iron)	13.25 to 13.75
Angle bars, steel	11.50 to 12.00

CLEVELAND

Small Ore Movement in October Compared With Last Year.

Office of THE IRON TRADE REVIEW,
Penton Building, Oct. 17.

Iron Ore.—It does not seem probable that the ore movement to Nov. 1 will exceed 2,000,000 tons, compared with 5,416,745 tons of ore carried last year after Nov. 1. Some vessel managers will make only one trip in November, and a large number of vessels are idle.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $5; Mesabi Bessemer, $4.75; old range non-Bessemer, $4.20; Mesabi non-Bessemer, $4.

Pig Iron.—With the exception of an inquiry for 3,000 tons of basic for the first quarter of next year, by the United Steel Co., of Canton, O., there is no business of importance pending. One Cleveland interest is not willing to sell basic for first quarter at less than $14.50 at the furnace, but valley prices are much below this. We quote, delivered in Cleveland for the remainder of the year, as follows:

No. 1 foundry	$14.50 to 14.75
No. 2 foundry	14.00 to 14.25
No. 2 Southern	15.35 to 15.85
Gray forge	14.00 to 14.25
Bessemer	15.65 to 15.90
Lake Superior charcoal	18.00 to 18.50
Jackson Co. 8 per cent silvery	19.00 to 19.50

Coke.—There is a scarcity of crushed and stock coke. The market is quiet and prices unchanged.

Connellsville furnace coke $1.60 to $1.70 for prompt delivery, and $1.70 to $1.75 on contracts. Connellsville foundry coke, $2.10 to $2.25 for prompt and $2.25 to $2.50 on contract.

Finished Material.—The subject of overshadowing importance is the action of the Carnegie Steel Co. in sending 20 salesmen into central western territory to get orders for the Pittsburg warehouse. Cleveland has long been noted for the strength of its jobbing companies, and there is keen interest to know how these companies will readjust themselves to the new conditions. One of the concerns a few years ago parted company with the leading sheet interest, but immediately tied up with independents, and its sales have increased under the new arrangement. Whether it would be possible to make a similar arrangement for bars, structural material, structural shapes and other materials, is problematical. Some Cleveland buyers who heretofore purchased their supplies through jobbers, are said to be inclined to place their orders with the Carnegie company direct, while others are still loyal to the jobbers, and say they expect to give them their patronage under equal conditions. A large part of building projects, involving a new hotel and other important new enterprises, are pending, and are still far from the contract stage. It is expected, however, that considerable tonnage will soon be placed for the Y. M. C. A. buildings and other structures. The Lake Shore railroad is inquiring for 250 tons for bridge work. The Detroit, Toledo & Ironton railroad is about to place a contract for 1,400 tons of bridge material, which will probably be awarded to the American Bridge Co.

Old Material.—The local market continues in about the same condition that it has for two weeks. Small quantities of material are passing but consumers are buying from hand to mouth and are shopping among the dealers when in need. The Nickel Plate list will close Oct. 20, but it is not believed that dealers will take any more material from this list than they have from others closing earlier in the month. In fact, it is believed that railroads have a considerable quantity on hand and this acts as a repressive factor, the tendency in prices being downward. We continue to quote, gross tons, f. o. b. Cleveland, as follows:

Old iron rails	$16.00 to 16.50
Old steel rails (under 6 ft.)	14.00 to 14.50
Old car wheels	14.00 to 14.50
Old steel boiler plate	12.00 to 12.50
Malleable iron (railroad)	13.25 to 13.75
Steel axles	19.50 to 20.00
Malleable iron (agricultural)	12.00 to 12.50
Heavy steel	13.00 to 13.25
Country mixed steel	12.25 to 12.75

We quote, in gross tons, as follows:

No. 1 R. R. wrought	$12.50 to 13.00
No. 1 busheling	12.00 to 12.50
No. 1 machine cast	12.00 to 12.50
Axle turnings	9.00 to 9.50
Machine shop turnings	6.00 to 6.50
Grate bars	10.50 to 11.00
Pipes and flues	11.00 to 11.50

Tank iron	9.00 to 9.50
Sheet iron	5.00 to 5.50
Wrought drilling	6.50 to 7.00
Stove plate	11.00 to 11.25
Cast borings	6.00 to 6.50

Pig Iron Business Light and Disappointing.

Office of THE IRON TRADE REVIEW,
Room 11, Blymyer Bldg., Oct. 18.

Pig Iron.—The business transacted during the week in this territory has been light and disappointing to the trade in general. Foundries as a rule are said to be carrying light stocks and appear unwilling to cover for any distant period in the future. Sales made for the most part represent business of this character, and have been for small tonnage. Only two general inquiries of any special note are now reported as pending, one from an Indiana melter for 1,000 tons of analysis grades, the other from the same territory for 1,200 tons divided equally between northern and southern, both calling for delivery during the first six months of 1911. The leading cast iron pipe industry is said to be on the lookout for some round lots of No. 3 and No. 4, and gray forge, and will no doubt buy if prices are satisfactory. Reports indicate, however, that there is more or less shortage on furnace yards of these particular grades, and the ratio of quotations is being well maintained. Southern quotations have made no changes from last week's figures and, so far as can be ascertained, are holding well. The week's make in northern irons has apparently been of such small volume that nothing has developed to change quotations, $14, Ironton, probably representing the schedule for this year's delivery. We quote prices based on freight rate of $3.25 from Birmingham, and $1.20 from Ironton, as follows:

	1910,	First quarter 1911.
Southern foundry No. 1		$14.75 to 15.25
Southern foundry No. 2		14.25 to 14.75
Southern foundry No. 3		13.75 to 14.25
Southern foundry No. 4		13.75 to 14.25
Southern No. 1 soft		14.75 to 15.25
Southern No. 2 soft		14.25 to 14.75
Southern gray forge		13.75 to 14.25
Northern No. 1 foundry		15.70 to 15.95
Northern No. 2 foundry		15.20 to 15.45
Northern No. 3 foundry		14.70 to 14.95
Jackson county 6 per cent silicon		18.20
Jackson county 8 per cent silicon		19.20 to 19.70
Jackson county 10 per cent silicon		20.20

Coke.—There has been no material change in the situation and the market is quiet and sales light. The usual contracting continues in evidence, but little is expected in this line until a month or so later. Shipments on contracts are coming forward in a satisfactory manner, and little delay is experienced. We quote prices from the leading coke producing districts as follows:

	Prompt shipment	During year.
Connellsville district:		
Foundry coke	$2.10 to 2.25	$2.25 to 2.50
Furnace coke	1.55 to 1.65	1.75 to 1.85
Wise county district:		
Foundry coke	2.00 to 2.25	2.15 to 2.25
Furnace coke	1.65 to 1.75	*Sliding [scale basis.
Pocahontas district:		
Foundry coke	2.10 to 2.25	2.25 to 2.50
Furnace coke	1.65 to 1.75	1.75 to 1.85
New river:		
Foundry coke	2.50 to 3.25	2.60 to 3.25
Furnace coke	2.20 to 2.30	2.20 to 2.30

*Sliding scale basis means $1.60 for coke based on $9, Birmingham, for pig iron, with an advance of 16 2-3 per cent of the amount over $9 at which pig iron is quoted. This is the usual basis. Other forms of sliding contracts are also made.

Finished Material.—Plates, shapes and bars are quotable at 1.40c, Pittsburg. The aggregate tonnage of the week is said to have compared very favorably with its predecessor, although as a rule individual contracts were small. Structural developments viewed locally are below the average and there is nothing now pending that is of any moment. Demand for bars continues to be the feature, and promises well for the future.

Old Material.—The mills are apparently indifferent regarding consignments of scrap, yet are willing to buy on concessions. Considerable flexibility is noted in prices, which vary according to circumstances. As one dealer expresses it, each sale apparently has a distinct price of its own, independent of other sales of the same grade. Prices shown in the revised schedule below represent as nearly as can be obtained, dealers' figures.

Old No. 1 R. R. wrought, net tons	$10.50 to 11.00
No. 1 machinery, net	10.00 to 10.50
No. 1 busheling, net	10.00 to 10.50
Old iron rails, gross	16.00 to 16.50
Old steel rerolling, gross	15.50 to 16.00
Old short lengths, gross	14.50 to 15.00
Old iron axles, net	18.00 to 18.50
Heavy melting scrap, gross	11.00 to 11.50
Stove plate, net	8.00 to 8.50
Heavy turnings, net	6.00 to 6.50
Cast borings, net	4.50 to 5.00
Car wheels	13.00 to 13.50
Grate bars	8.50 to 9.00

Iron Market Waiting—Former Syndicate Mill Takes Scrap.

Oct. 17.

Pig Iron.—The relative positions of buyers and sellers of pig iron remain unchanged as the former appear in no hurry to freely negotiate for their needs after the first of the year, and the furnaces are showing no disposition to be aggressive and encourage such contracting at ruling prices. The situation has gotten down to a point where the makers of iron are as willing to take chances upon first quarter and first half as the buyers by awaiting for the future outlook for business to clarify in some respects before finally deciding their policies. As a consequence, the market shows no expansion and the tonnage sold continues along quiet and very ordinary lines. Pipe iron is moving best of all, which has been a usual condition in this market recently. The leading cast iron pipe interest closed for several thousand tons additional in the week, and has bought in the past two weeks probably 8,000 to 10,000 tons for this territory, most of which was northern iron at prices ranging from about $14.50 to $14.70, delivered. On this basis, some of the northern lower grades are cheaper than the same class of southern irons. Another cast iron pipe maker in this district also took a tonnage of northern iron. The recent minimum of the basic market, $14.50, delivered, has been duplicated by an eastern buyer who has recently been active in picking up various lots. This consumer has engaged probably 10,000 tons for this year's delivery in the past several weeks, the large part of which was on trade deals and readjustments of old contracts. Except where contracts run into next year, little basic has been sold for shipment after Jan. 1. Light sales of low phosphorus at about $22.50, delivered, Philadelphia, are noted. In Virginia, more frequent cases are apparent where $13, furnace, has been done on No. 2X. This price is by no means general, however, and is available only on attractive prompt lots with certain makers.

We quote for shipment this year to Philadelphia and vicinity, as follows:

No. 1X foundry	$16.25 to 16.50
No. 2X foundry	15.75 to 16.00
No. 2 plain	15.25 to 15.75
Standard gray forge	14.50 to 14.75
Basic	14.50 to 15.00
No. 2X Virginia	15.80 to 16.30
No. 2 southern	15.00 to 15.50
Low phosphorus	22.50 to 23.00

Finished Material.—A lack of active buying still characterizes the market for finished products. In view of the comparatively light volume of trade, prices are holding especially well, and the mills with a fair tonnage on their books still to be shipped against, are adopting no radical measures, hoping for some improvement in the final quarter of the year.

The American Bridge Co. has received the award of 2,000 tons for the Philadelphia & Reading works in the Port Richmond district, this city. Its bid, 2.86c per pound, erected, is regarded as low because of special features of the work. The plans for a

large amount of additional steel construction by this railroad in the Port Richmond district are in their final stages, and will soon be before the trade. Some large-sized bridges are included, one calling for 3,000 tons of 24-inch beams. The Norfolk & Western railroad has taken no action upon its inquiry for 5,000 tons of steel for cars, but is expected to do this shortly. Railroad buying as a whole, however, is light. New structural jobs in Philadelphia territory are limited.

We quote for delivery in Philadelphia and vicinity, as follows:

Structural shapes, 1.55c to 1.60c; steel bars, 1.55c to 1.60c; iron bars, 1.40c to 1.50c; 4 x 4-inch open-hearth rolling billets, $26, eastern mill; forging billets, $28, eastern mill.

Old Material.—Former members of the dissolved syndicate of steel scrap consumers have been more freely making offers in the open market for material, although most of these tenders are at nominal figures, as these mills have a considerable stock of material in their yards or being shipped. One of the six mills which was affiliated with the association has been offering $14.25, delivered, for heavy steel, and has been buying actively. It has closed in all for about 15,000 to 20,000 tons from different dealers, showing that there is little faith on its part that any new, concerted plan of buying which would overcome the federal objections to the old method, will be devised. Borings have eased off somewhat, but other grades show no change either in price or trading activity. We quote, gross tons, delivered in eastern Pennsylvania consuming territory, as follows:

Old steel rails (rerolling)	$15.75 to 16.25
Heavy melting steel	14.00 to 14.50
Old car wheels	13.75 to 14.25
Old iron car axles	25.00 to 26.00
Old steel car axles	20.00 to 21.00
No. 1 railroad wrought	16.50 to 17.00
Wrought pipe	13.00 to 13.50
Cast borings	9.00 to 9.50
Wrought turnings	8.75 to 9.25
Heavy cast scrap	14.00 to 14.50
Railroad malleable	13.50 to 14.00
Stove plate	10.50 to 11.00

NEW YORK

Ocean Ore Freights Advance—Forward Iron Prices Settling.

Office of THE IRON TRADE REVIEW,
1115 West Street Bldg., Oct. 18.

Iron Ore.—A recent charter of the Spanish steamer Otoyo for a cargo of 5000 tons of ore from Almeria, Spain, to Philadelphia, was done at 10s 6d, which represents another substantial advance in the ocean freight market on trans-Atlantic ore. At this level of rates and with the increased prices asked by foreign miners for their ore, the delivered value of this ore to eastern blast furnaces is at present fully $1 a ton higher than the basis upon which it was contracted for this season's delivery during the latter part of 1909. Of this advance, about half is due to higher freights and half to the increased value per unit of ore asked by the miners. Illustrating the unfavorable position in which the eastern furnaceman now finds himself, it is to be noted that in the period in which his ore costs have advanced $1 a ton if he depends upon a foreign base of supply pig iron prices have declined $4 a ton.

Pig Iron.—As the furnaces are showing a greater disposition not to insist upon premiums over today's prices for first quarter business, buyers seem a little more alert to take advantage of their opportunities and a fair aggregate of sales is to be noted in the eastern coast territory in the week. Asking prices for first quarter appear to be settling in actual transactions to about the level prevailing for the remainder of the year or to figures which show only a slight margin of advance. Nevertheless, there is still a holding back of the furnaces in offering this forward iron at such prices as well as a disposition of consumers to move slowly. It may, therefore, be said that first quarter buying has scarcely been started on a liberal scale. Stove makers in the east have closed for a fair tonnage, one of them taking about 6,000 tons for first quarter at only a small margin of advance over this year's market of $15 for No. 2X at eastern Pennsylvania furnaces. In New England, one consumer has taken 500 tons of foundry grades for first quarter and valve makers have bought from 500 to 1,000 tons. The eastern cast iron pipe companies which have made additional purchases of lower grades to those already reported, have closed for upwards of 20,000 tons in the past ten days or two weeks. The leading pipe maker has also bought some iron for western plants. It is significant that most of the tonnage taken in the east has been northern iron.

We quote, delivered at eastern tidewater, for shipment this year, as follows:

Northern foundry No. 1	$15.75 to 16.25
No. 2X foundry	15.25 to 15.75
No. 2 plain	15.00 to 15.25
No. 2 Virginia	15.80 to 16.30
No. 2 southern foundry	15.25 to 15.75
Malleable	16.00 to 16.50
Gray forge	14.75 to 15.00

Ferro-Alloys.—The week has developed some sizeable buying in ferro-manganese over the first half amounting to probably 4,000 tons, the great part of which is to western steel companies. One lot of 500 tons was booked in the east. Prices continue well around $39, seaboard, although contrary reports are to be heard. Ferro-silicon selling is light. We quote 80 per cent ferro-manganese, covering all deliveries up to second half, at from $39 to $39.25, seaboard, and 50 per cent ferro-silicon at from $53 to $54, seaboard.

Cast Iron Pipe.—The better volume of trading in cast iron pipe continues, but prices show no improvement. R. D. Wood & Co., of Philadelphia, have taken 900 tons for Croton, N. Y., at $21.90 delivered, and the Donalson Iron Co., 800 tons for Letchworth, N. Y., at $21.70, delivered. The leading interest has 400 tons for Goshen, N. Y., and about 100 tons for repair work in Manhattan. We quote 6-inch pipe at from $22 to $22.50 f. o. b. New York in carload lots.

Finished Material.—With some of the larger steel makers there has been recently noted a more even run of new business and a slight improvement in the spasmodic conditions that have prevailed. The absence of any sizeable railroad tonnage is still apparently the most unfavorable factor of the situation.

In the railroad line, the week's awards include 600 tons to the American Bridge Co., for a number of bridges for the Atcheson, Topeka & Santa Fe; 400 tons for a bridge for the Baltimore & Ohio, at Baltimore, to the McClintic-Marshall Construction Co.; and 200 tons to the American Bridge Co., by the Baltimore & Ohio, for another small bridge. It is also reported that the 2,000 tons for catenary bridges for the New York, Westchester & Boston have been placed. The 2,000 tons for the New York Central terminal work in New York City, recently put out, is still pending. The contractors are asking for bids on the steel for a station at Jamaica, L. I., 400 tons, for the Long Island railroad.

The Hochschield-Kohn department store at Baltimore, 1,350 tons, has gone to Chesapeake Iron Works and Vierling & McDowell have taken 1,300 tons for the new shop of the Western Electric Co., at Hawthorne, Ill., near Chicago. The King Bridge Co. has 500 tons for a highway bridge at Spokane, Wash., and 500 tons for the Knickerbocker Portland Cement Co. plant, Hudson, N. Y., has gone to an independent shop. A recent important export order to be placed is

for 6,000 tons of bridge work for a railroad in Honolulu, placed by the Honolulu Iron Works through Hamilton & Chambers, New York City.

The largest new contract to come out is that for the steel for the superstructure of the new postoffice building in New York at the Pennsylvania railroad terminals, which will require about 14,000 tons. Bids will go in Oct. 31. About 10,000 to 12,000 tons has already been contracted for for the sub-structure and much of this is now erected. The Geo. A. Fuller Co., the general contractor, is inquiring for 1,600 tons for the improvements to the Knickerbocker Trust Co. building, New York City, which provides for the elevation to 22 stories. Bids went in this week on 750 tons for a county bridge at Wilkesbarre, Pa.

In the Quebec bridge letting, it is unofficially reported that the lowest bid entered was that of the English syndicate, composed of the Darlington Manchester and Cleveland bridge companies.

We quote, New York delivery, as follows: Angles, 3 to 6 inches x ¼ inch and heavier, 1.56c to 1.61c; beams, 3 to 15 inches, 1.56c to 1.61c; tees, 3 x ¼ inch and heavier, 1.56c to 1.61c; plates, carload, tank, 1.56c to 1.61c; boiler steel, 1.66c to 1.71c; marine boiler, 1.96c to 2.06c; bar iron, 1.40c to 1.45c; soft steel bars, 1.56c to 1.61c.

Old Material.—The market displays a fair amount of buying which, as for some time past, is largely in small lots. Generally the different grades are holding steady in prices, but there are some further declines, namely in wrought pipe, where the principal iron mill buyers have recently lowered their offers. Cast borings and heavy cast are also easier. About 1,100 tons of Panama scrap is offered for bids Oct. 20 by the Pennsylvania railroad, which has recently assumed the direct selling of the scrap from the Isthmus in conjunction with the Panama railroad, which transports it to New York harbor. We quote, gross tons, prices New York dealers will pay at tidewater, with the exception of cast scrap, which has a local demand, as follows:

Old steel rails (rerolling)	$14.50 to 15.00
Old car wheels	12.00 to 12.50
Old iron axles	21.50 to 22.00
Old steel shafting	16.50 to 17.00
Heavy melting steel	11.50 to 11.75
No. 1 R. R. wrought	13.75 to 14.00
Iron track scrap	13.00 to 13.50
Wrought pipe	10.50 to 11.00
Cast borings	6.75 to 7.00
Wrought turnings	6.50 to 7.00
Heavy cast scrap	12.50 to 13.00
Railroad malleable	12.50 to 13.00
Stove plate	9.00 to 9.50
Grate bars	9.50 to 9.75

The Atlas Belting Co., Chicago, has increased its capital stock from $100,000 to $150,000.

ST. LOUIS

Basic Sold to Grand Crossing Tack Co.—Inquiry For Southern.

Oct. 18.

Pig Iron.—The only inquiry for pig iron in the St. Louis territory is for 2,000 tons of southern No. 2 foundry for delivery over the second half of 1910, although there are scattering inquiries totalling about 500 tons. The inquiry for 5,000 tons of basic, which has been in the St. Louis market for the last 10 days, was closed in Chicago. The Grand Crossing Tack Co. was the purchaser. Prices remain at $11 to $11.50 for southern No. 2, Birmingham basis, for delivery over the balance of the year; $11.50 for first quarter shipment, with no quotations for first half delivery. Northern iron is stationary at $14.50 to $15, No. 2, foundry, f. o. b. furnace.

Our prices on southern iron, delivered, to which the Birmingham freight of $3.75 has been added, follow:

Southern No. 1	$15.50 to 16.00
Southern No. 2	15.00 to 15.50
Southern No. 3	14.50 to 15.00
Southern No. 4	14.00 to 14.50

Coke.—There are inquiries for 25 to 40 cars of foundry coke in the St. Louis territory, for shipment over the remainder of 1910 and the first half of next year, and sales are reported to have been made within the last few days totalling 10 to 15 cars for delivery over the remainder of the year.

The coke market seems to be a little more active than it has been for the last two months. Prices are as follows:

Best-selected 72-hour Connellsville foundry grades, $2.35 to $2.50, ovens; second best 72-hour foundry, $2 to $2.25, on contract and for immediate delivery; 48-hour Connellsville furnace, $1.60 to $1.85; best 72-hour Virginia foundry, $2 to $2.35; 48-hour Virginia furnace, $1.60 to $1.85. The freight to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when shipment is destined beyond St. Louis.

Finished Material.—We quote the following base prices out of stock, St. Louis:

Tank plates, ¼ inch and heavier up to 72 inches wide, $1.90 to $2; from 72 inches to 96 inches, $2 to $2.10; sheets, No. 10, blue annealed, $2.30 to $2.40; bar iron, $1.75 to $1.85; soft steel bars, $1.90 to $2.

Old Material.—The market for scrap iron is almost at a standstill, with slight reductions in quotations on net tons of No. 1 railroad wrought, No. 2 railroad wrought, iron angle splice bars and steel angle splice bars. There is very little scrap iron being consumed, but the offerings are a little freer, showing a disposition on the part of dealers to sell. Some of the mills are closed down.

Our quotations remain nominally as follows:

Old car wheels	$13.50 to 14.00
Old iron rails	14.50 to 15.00
Rerolling rails (4 ft. and over)	14.25 to 14.50
Old steel rails (2 ft. and under)	13.00 to 13.50
Light section relayers, 45 lbs. and under, subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	24.50 to 25.00
Frogs, switches and guards	12.50 to 13.00
Heavy melting steel	12.00 to 12.50
Shoveling steel	12.00 to 12.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$11.75 to 12.25
No. 2 R. R. wrought	10.75 to 11.25
Arch bars and transoms	14.50 to 15.00
Knuckles, couplers and springs	12.00 to 12.50
Shafting	15.00 to 15.50
Iron car axles	19.00 to 20.00
Steel car axles	19.00 to 20.00
Locomotive tires	16.00 to 16.50
No. 1 country wrought	10.00 to 10.50
Pipes and flues	9.25 to 9.75
No. 1 cast, 510 lbs. and less	12.50 to 13.00
No. 1 busheling	10.75 to 11.25
No. 2 busheling	7.00 to 7.50
No. 1 boiler cut	9.25 to 9.75
Boiler punchings	11.00 to 11.50
Cast and mixed borings	5.00 to 5.50
Machine shop turnings	7.25 to 7.75
Railroad malleable	10.00 to 10.50
Agricultural malleable	9.00 to 9.50
Stove plate and light cast scrap	9.50 to 10.00
Angle splice bars, iron	13.50 to 14.00
Angle splice bars, steel	12.50 to 13.00

BUFFALO

Considerable Tonnage Under Negotiation—Foundry Iron Bookings.

Oct. 18.

Pig Iron.—A larger total has been placed within the last week than for some time past and there is still a large total tonnage under negotiation. The bookings of foundry iron for the week are estimated at close to 15,000 tons, and there were some sales of malleable and basic. The orders ranged from 50 tons to sizable tonnage. A large part of the business was for the balance of the year, but some of the contracts extend into 1911. The selling interests take this increase in bookings to indicate that buyers are reaching the conclusion that the proper time to buy has arrived and they are ready to place business. It is expected that a large part of the tonnage under negotiation will be placed in the near future. Shipments from the blast furnaces are keeping up a remarkably good pace and some of the furnaces have practically cleaned their yards of stock. The prices of last week are unchanged and furnace interests say that iron is being sold at a loss.

We quote, f. o. b. furnace, as follows:

No. 1X foundry	$15.00 to 15.50
No. 2X foundry	14.50 to 15.00
No. 2 plain	14.25 to 14.75
No. 3 foundry	14.00 to 14.50
Gray forge	14.00 to 14.50
Malleable	14.75 to 15.25
Basic	14.75 to 15.25
Charcoal	18.75 to 19.25

Finished Products. — Although a more hopeful feeling prevails, there is little change in the market. Specifications of all kinds are coming in very

slowly, and there has been a falling off in inquiries. No large lettings are reported. Prices remain firm.

Old Material.—Business continues dull. Few sales have been made and there seems to be little interest. The following prices indicate the market:

Heavy melting steel	$12.25 to 12.50
No. 1 railroad wrought scrap	14.50 to 15.00
No. 1 railroad and machine cast scrap	13.50 to 14.00
Old steel axles	17.00 to 18.00
Iron axles	23.00 to 24.00
Car wheels	13.75 to 14.25
Railroad malleable scrap	13.75 to 14.00
Machine shop turnings	6.75 to 7.00
Cast iron borings	5.00 to 5.50
Low phosphorus steel scrap	17.00 to 17.50
Old iron rails	15.50 to 16.00
Tank iron	10.75 to 11.00
Sheet iron	6.50 to 7.00
Stove plate	12.00 to 12.50
Pipes and flues	10.25 to 10.75
Grate bars	11.50 to 12.00
Boiler plate	11.00 to 11.50

BIRMINGHAM

Detroit Letting Brings Out Low Cast Iron Pipe Prices.

Birmingham, Ala., Oct. 17.

Pig Iron.—Some round tonnage lots of iron were sold during the week—in blocks of 500 to 800 tons—on a basis of $11 to $11.50 per ton, at the furnace. The aggregate tonnage, however, was not large. Conditions continue to drag along in about the same manner as for several weeks past. For delivery the remainder of this year, iron can be bought on a basis of $11 per ton, at the furnace; but this price is in no sense the market price, for sales are being made right along for the same delivery at $11.50 per ton, at the furnace, by some interests. The tonnage offered for next year's delivery is comparatively small, and a lower price than $11.50 per ton, at the furnace, for this business is not confirmed. Such sales are largely confined to first quarter delivery. There are some Birmingham furnace interests that refuse to quote iron for delivery beyond Dec. 31, 1910. The outlook for the immediate future seems but a shade better than the week previous. There is no doubt that there will have to be more interest manifested by the larger buyers of the country before anything like satisfactory conditions can exist. Charcoal iron is quoted at $22 to $22.50 per ton, at the furnace.

Cast Iron Pipe.—It is pretty thoroughly understood that the Detroit letting brought out some exceedingly low quotations—as low as $18 per ton, at the manufacturer's plant. Kansas City, Kas., as well as Kansas City, Mo., and Salt Lake City placed orders for about 5,000 tons the past week. The following prices are quoted, per net ton f. o. b. cars here: Four to six-inch, $20.50 to $21; 8 to 12-inch, $20; over 12-inch, average of $19, with $1 per ton extra for gas pipe.

Old Material.—The scrap market continues to drag. Enough sales are made to keep the yards in about normal shape. Dealers increase their stocks when buyers are found who are willing to dispose of their material on present low levels. Following are nominal quotations:

Old iron rails	$13.50 to 14.00
Old steel axles	16.50 to 17.00
Old iron axles	17.00 to 17.50
No. 1 R. R. wrought	11.50 to 12.00
No. 2 R. R. wrought	10.50 to 11.00
Dealers' wrought	10.00 to 10.50
Old steel rails	11.00 to 11.50
No. 1 machinery	10.00 to 10.50
No. 1 steel	10.00 to 10.50
Old standard car wheels	12.50 to 13.00
Light castings, stove plate	8.50 to 9.00

British Iron Market.

More Cheerful Outlook for Pig Iron and Finished Materials.

Office of THE IRON TRADE REVIEW, Prince's Chambers, Corporation St., Birmingham, Eng., Oct. 8.

The last day or two has seen a marked improvement in the pig iron market, which appears to suggest a decided recovery. At Middlesbrough yesterday the tone was more hopeful than for a long time past. Pig iron warrants improved by 3d per ton on the day, making an advance of 7d since Wednesday morning. The selling price was 49s 6d ($12.12), cash, 49s 10½d ($12.21), one month, and 50s 4½d ($12.33), three months. There was a turnover on the day of 10,000 tons. Large business was done with Scotch consumers, who are confident of an early settlement of the shipbuilding lockout. There has been a little decrease in Connal's store, the tonnage now being 476,799 tons. The position has been improved by the settlement of the cotton strike, Lancashire being in many ways a very good iron and steel customer. There is no great change in the hematite business, prices remaining much as they were with mixed northeastern varieties selling at 62s 6d ($15.30); but it is significant that concessions are not obtainable, as they have been for second hands. Makers are not at all anxious to sell into next year, and consumers, on the other hand, are thinking seriously of securing their future supplies. Fuel continues strong, and rubio ore in the North of England maintains very good prices.

Finished Material.—In the finished department the event which has attracted most attention has been an advance of 5s in the price of finished steel. It applies to all sections except joists, which are not classified in this group. A great deal of importance is attached to the move, seeing that it has been effected in spite of some recent shading in raw materials. It is taken as showing a very sound condition of affairs. Shipyards are now buying plentifully in the expectation of an early settlement. Great satisfaction is expressed with the peace secured in the cotton trade, which re-opens an important market, especially for engineering and mill appliances.

In the iron trade there are great complaints as to prices, and, while £6 5s practically leaves no profit, there are some makers taking orders below this figure. An excellent trade is being done in galvanized sheets, for which the selling figure of £11 10s is maintained. The mills are generally very well off for work. Shipments have been unusually heavy this week of tin plate to America. The Welsh stocks are approaching extinction. All the mills are working to their full capacity. For tin plates, there has been an official advance this week of 3 halfpence per box.

IMPROVEMENT

Still Continues in Germany—Manufacturing Costs Advance.

Dusseldorf, Oct. 5.

The improvement reported in the last letter continues to make further progress, and, especially the inland market is very good. A very active autumn business has set in, following many strikes and troubles with the workmen which had to be settled during the summer. The better tone of the market is caused in part by the fact that the manufacturing costs are rapidly growing, because not only fuel prices are increasing, but also the prices for inland and foreign ores are quoted far higher. The inland prices of the new pig iron syndicate are as follows: Best hematite, 70 marks ($16.70); foundry No. 1, 66 marks ($15.75); foundry No. 3, 64 marks ($15.25); spiegeleisen with 10 to 12 per cent manganese, 63 to 65 marks ($15 to $15.50); steel iron, 59 to 60 marks ($14 to $14.25). English hematite, which in previous years was imported into Germany in heavy quantities, cannot come in now against such prices, as the price for English hematite would be at least 80 marks f. o. t. Duisburg, duty (10 marks or $2.50) paid.

The scrap market is very firm at advancing prices, although the deliveries are greater. In half finished material, the demand has grown very largely and the increased prices are obtained without difficulty. In bar iron, inland consumers bought so strongly that the producers had to decrease the quantity for export. The worst part of the market remains still railway material, but the state railway has at last given out orders

for about 500 locomotives. In sheets, the export business is far better than the inland consumption and the prices are good. In ship plates, orders come in very freely, although the ship yards are constantly having trouble with their workmen.

The increase of our bank rate from 4 to 5 per cent has not yet had any influence on business. The movement to syndicate all the products which are not yet syndicated is making further progress.

Dullness Prevails in Pig Iron—Finished Lines More Active.

Office of THE IRON TRADE REVIEW, 942 Henry Bldg., Oct. 10.

Pig Iron.—Practically all the foundries are supplied for the remainder of the year and the market is inactive. Deliveries for the first quarter are being held at about 50 cents higher than spot quotations. Very little iron is expected for this market until November, when several ships with cargoes of foreign are due. A small amount of southern iron is being sold to local firms at $23.20 for No. 1, and $22.70 for No. 2. The Western Steel Corporation is receiving a large amount of Chinese pig for use in its open-hearth furnaces and is stocking its own iron for future use. Work will commence soon on its new blast furnace, which will be the first unit of its new plant. The Western Steel Corporation has just put into operation a steel casting plant which is the first open-hearth steel castings plant on the Pacific coast.

A large number of foundries are taking work at a very low figure in preference to reducing their working force. Lumber charters have been poor and the saw mills of the northwest are doing very little. As a majority of the foundry work depends on the lumber and saw mill trade, business is quiet. The majority of shops have had a good summer trade and consider the future promising. A number of small contracts are being filled for bridge castings.

We quote in gross tons, foreign iron ex ship Puget sound or Columbia river, domestic, f. o. b. Pacific coast terminal, as follows:

No. 1 English Jarrow, spot	$23.50 to 24.00
No. 1 Chinese, Hanyang spot	23.50 to 24.00
English Doncaster, spot	23.50
No. 1 Cleveland, spot	23.00 to 23.50
No. 1 Glengarnock, future	23.00 to 23.75
No. 1 Southern, spot	23.20

METAL MARKETS.

St. Louis.

Oct. 17.

Lead and Zinc.—Zinc blende brought a top price of $47 a ton in the Missouri-Kansas-Oklahoma district last week for choice lots, with 40 per cent grades ranging from $44.50 to $42 a ton. The highest basis for standard qualities was $44, and the average price for all grades $41.85, compared with $41.50 the previous week.

Calamine was strong and in good demand, 40 per cent qualities ranging from $26 to $22 a ton, and extra choice lots bringing $30 a ton. The average price paid was $29.20, compared to $26.80 the week before.

Lead ore slumped from $55 a ton, the price of the previous week, to $53, although a few choice lots brought as much as $54. The average price obtained was $53.11, compared to $54.61 the week before.

At the close of the week, spelter at St. Louis was firm at $5.42½. Lead was rather dull at $4.25.

Chicago.

Oct. 18.

New Metals.—Some improvement is noted since the last report and there has been an encouraging increase in purchases of copper and tin. Efforts are being made to induce even larger buying in copper, but with only moderate success. The local market is feeling the effects of the speculation in tin in the east and in London, and the price of this commodity is very unsettled. Present prices are regarded as purely speculative and not warranted by actual conditions. The demand for spelter is not heavy and the price has fallen off another 5 cents. Consumers of spelter are endeavoring to break the market, but producers are standing together and consumption considered, the price of this metal in Chicago is very firm.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

Lake copper, carload lots, 13½c; casting, 13¼c; smaller lots, ¼c to ⅜c higher. Spelter, car lots, 5.45c to 5.50c; lead, desilverized, 4.35c in 50-ton lots; corroding, 25c per 100 pounds higher; sheet zinc, $7.50 list, f. o. b. La Salle, in car lots of 600-pound casks; pig tin, 38c; Cookson's antimony, 10½c; other grades, 9¾c to 10¼c.

Old Metals.—Old metals are commencing to feel a little of the buoyancy exhibited in the new metal market and the feeling in the trade is somewhat better. Business, however, is light and buying is only for current needs; consumers do not show a great deal of interest in their future requirements. Prices are quite stable.

We quote dealers' selling prices, f. o. b. Chicago, as follows: Copper wire, 11¼c; heavy copper, 11¼c; light copper, 10½c; heavy red brass, 10⅜c; heavy yellow brass, 8c; light brass, 6¼c; No. 1 red brass borings, 9¼c; No. 1 yellow brass borings, 6½c; brass clippings, 8c; tea lead, 3.65c; lead scrap, 3.90c; zinc, 4c; tin pipe, 32.5c; tin foil, 29.5c; pewter, 23.5c; electrotype plates, free from wood, 4½c; electrotype dross, 3c; stereotype plates, 4½c; stereotype dross, 3¼c; linotype dross, 3¼c; prime slab zinc dross, $78 per ton.

New York.

Oct. 18.

Copper.—A further advance in prices of copper metal followed the publication of the London fortnightly copper statistics. The report shows that stocks decreased 2,050 tons during the first half of October, and the tonnage afloat increased 250 tons, leaving a net decrease in visible supply of 1,800 tons. In the London market the prices of standard copper touched the highest point reached since April 18, on transactions amounting to 4,200 tons. Spot sold at £57 12s 6d; and three months at £58 10s. The local market has advanced in proportion to the foreign improvement and there is noticeable increase in the volume of business over last week. The leading sellers are now asking 12.87½c for electrolytic for Connecticut valley delivery, and 12.75c cash, New York. Lake copper has been quiet but firm, at 12.87½c to 13c. While the exports have not been as heavy as for the corresponding period in September, yet the difference is not great, and indications favor a total of approximately 30,000 tons for this month.

The exports since Oct. 1 are 14,203 tons.

Tin.—Another week of a syndicate-controlled market has been experienced, and consumers who have been forced to buy have had to pay an exorbitant premium for spot tin, on nearby deliveries. The high price of the week was 38c. Monday occurred a decline of 1½c to 36.50c, but the price of spot was forced up again today to 36.87½c, at the close. November and December positions can be had from 1c to 1½c under that level. The advance here is simply a reflection of the strength shown by the foreign quotations, as the local market is bare of spot tin. The Minneawaska is due to arrive Oct. 24 with 1,300 tons,

but as most of this cargo has already been disposed of, only a small part will come on the open market, and little relief will be afforded. The present indications are that the total arrivals for October will be between 4,000 and 4,200 tons.

The London market was very active, and closed at the high prices of the day on transactions of 1,240 tons. Spot closed at £165 10s; and three months at £161 10s, up £1 15s, each since Oct. 11.

Lead.—The pig lead situation is unchanged. The demand is fair and prices steady. All positions up to and including January, 1911, can be had at 4.45c, in New York. The leading interest continues to quote 4.40c.

Spelter.—The demand for spelter continues light and the price unchanged at 5.60c, in New York, for the balance of the year.

Antimony.—The antimony trade is stagnant. Cookson's is 8.12½c; Hallett's, 7.75c, and Hungarian, 7.25c.

AMERICAN AGENCY TAKEN OVER.

Joseph Schaeffers, M. E., who for a number of years was connected with the Simplex Automobile Co., and later on with J. M. Ellsworth, of 18 West Twenty-second street, New York, in the building of motor cars, has taken over the American agency of the Lindenberg Steel Mills, Remscheid-Hasten, Germany, which are manufacturers of high grade tool steels, high speed steels, and alloy steels of every description. Mr. Schaeffers has opened offices at 141 Broadway, New York, and stock rooms in South Brooklyn.

ADMITTED TO COMPANY.

P. G. Jenks and William Wieman, who have been identified for some time with Banning Cooper & Co., Ltd., dealers in pig iron and coke, with offices on the fourteenth floor of the Oliver building, Pittsburg, have been admitted as members of that company, effective Oct. 17. Mr. Jenks will be treasurer and Mr. Wieman secretary. S. G. Cooper is president and C. F. Banning is chairman. The company was organized 11 years ago.

The Cincinnati Iron & Steel Co. has taken a three months' lease on the Union Sheet & Tin Plate Co.'s plant at Marietta, O. The plant, which is idle at present, likely will be started within the next two weeks. Sheet bars for the Marietta plant are being shipped by the Lackawanna Steel Co.

PALMER LAUNCHED

In Honor of Steel and Wire President —September Ore Movement.

The bulk freighter William P. Palmer was launched from the Ecorse yard of the Great Lakes Engineering Works, on Saturday, being named in honor of the president of the American Steel & Wire Co., and christened by his six-year-old daughter Jane. The Palmer is built upon the Isherwood or longitudinal system of construction and is the first of her kind to be built on the lakes. Moreover, she is said to be the finest example of a bulk freighter on the lakes. Her launching weight is estimated as being 384 tons less than that of her sister ship, the Dickson. Within an hour after she had been launched one of her boilers had been installed and in that trim she drew 13 inches less water than the Dickson. She ought to be, therefore, a more profitable ship. The Palmer is 600 feet over all, 580-foot keel, 58-foot beam, and 32 feet deep. A notable delegation of steel and vessel men attended the launching.

The ore trade is rapidly being brought to a close. Quite a number of vessel men will move their requirements during October and there will be little for the wild fleet to do after Nov. 1.

Lake Erie ore receipts for September were as follows:

	Tons.
Buffalo	651,599
Conneaut	1,048,269
Erie	109,384
Ashtabula	1,335,454
Fairport	226,772
Lorain	440,598
Cleveland	1,124,347
Huron	25,660
Sandusky	.....
Toledo	210,971
Detroit	56,039
Total	5,229,093

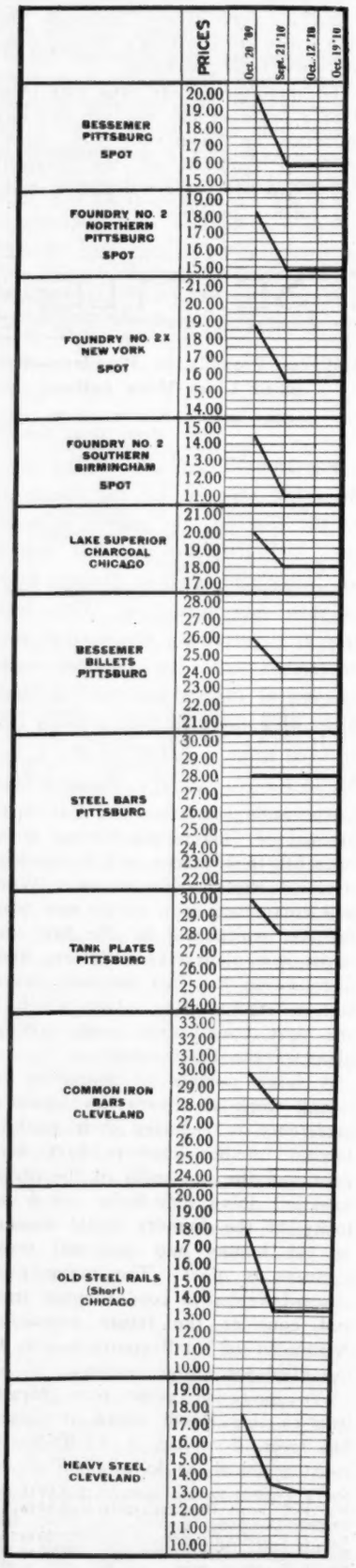
Lake Michigan ore receipts for September were as follows:

	Tons.
South Chicago, Ill.	670,921
Elk Rapids, Mich.	5,346
Boyne City, Mich.	12,415
East Jordan, Mich.	.....
Indiana Harbor, Ind.	34,114
Milwaukee, Wis.	23,021
Gary, Ind.	292,851
Fruitport, Mich.	7,984
	1,046,652

Locomotive Orders.—The Chicago Junction Railway, which recently ordered five six-wheel switching locomotives from the American Locomotive Co., has increased the number to 7.

J. G. White & Co., New York, have declared the regular quarterly preferred dividend of 1½ per cent, payable Nov. 1.

PRICE CHART



CARNEGIE STEEL CO.

Stops Paying Commissions to Jobbers

And Sends Out Salesmen to Take Orders for Pittsburg Warehouse—Part of General Corporation Policy.

The long expected and long predicted break between the jobbers and the United States Steel Corporation has come. For a number of years after its formation, the Steel Corporation sold a large part of its product through jobbers, and seemed content to do so, making liberal concessions to them, paying what practically amounted to commissions for handling the business. Gradually, however, the Steel Corporation manifested a disposition to establish warehouses and handle its own products in a retail way. The building of the warehouse at Waverly, near New York City, was an important step in this direction.

A few weeks ago, however, the most radical action was taken in the withdrawing of price concessions made to jobbers by the Steel Corporation. Following this action, the Carnegie Steel Co. a few days ago sent out 20 salesmen to represent its Pittsburg warehouse and scour the central west for warehouse orders. Several were sent to Cleveland, several to Cincinnati, and others to different parts of the central west, including West Virginia.

Jobbers generally now regard it as imperative for them to adopt new business methods. Some say the only recourse is to break entirely with the Corporation and sell the products of independent concerns which are willing to make some concessions to jobbers. Some very important developments may follow. It is already hinted that a steel plant may be built in Cleveland to manufacture some of the products now turned out by the Carnegie Steel Co.

It is understood that salesmen will sell on a basis of 1.75c, Pittsburg, for plates, shapes and bars, this being an advance of $7 a ton over mill prices.

The company has four warehouses, at Waverley, N. J., Chicago, St. Louis and Pittsburg, and contemplates building warehouses in Omaha, San Francisco and possibly other cities.

The above news item published Oct. 17, caused an immense amount of discussion in the trade. The demand for copies of the daily was unprecedented and prominent men in the trade who know the facts, declared the article absolutely correct.

The question now is—will the independents open their own warehouses, or will they sell their products through jobbers?

Representatives of neither the independents nor the jobbers are willing to express their opinion. Both are waiting for advances to be made.

Some independents have, it is understood, made propositions to leading jobbers to handle their products, but other independents have taken no action.

Some jobbers already have a pretty good line of independent products to offer, but it will be difficult for them to get a full line of plates, structural shapes and bars without patronizing the United States Steel Corporation.

It is understood that some interests which have heretofore bought through jobbers are now placing orders with the Carnegie Steel Co.

AMERICAN SHIP BUILDING CO.

Presents Its Report for Year Ending June 30.

The report of the American Ship Building Co. for the year ending June 30 last, as submitted to the recent annual meeting of shareholders, shows that net earnings were $1,980,-654.21. Deductions for maintenance and rebuilding dry docks were $543,-331.94; for paying preferred dividends, $553,000; leaving a surplus of $884,-322.27, equal to 11½ per cent on the common stock. The balance sheet shows $902,045 in cash in hand, and net current assets in excess of current liabilities of $4,600,000.

President James C. Wallace, while admitting that prospects for new business in the present fiscal year are not good, calls attention to the fact that modern unloading devices are calling for changes and repairs in construction of vessels that will undoubtedly give the company another very good year.

Copper exports for the week ending Oct. 13 were: 4,436 tons, a decrease of 2,484 tons; from Oct. 1 to Oct. 13, 9,066 tons, a decrease of 8,181 tons; from Jan. 1 to Oct. 13, 219,165 tons, a decrease of 24,604 tons.

NINTH CONVENTION

Of National Machine Tool Builders' Association in New York.

The National Machine Tool Builders' Association, which will meet in ninth annual convention in New York City, is looking forward to one of the most interesting as well as informing gatherings in the history of the association. The convention will be held Oct. 25 and 26, and headquarters have been established in the Hotel Astor, Times Square.

The first session will be held Tuesday morning, Oct. 25, and the roll will be called at 10 o'clock. Convention committees will be named, and the reports of officers and standing committees will be presented. The second session will be held in the afternoon, when a number of committees on stated subjects will assemble at various hours named. The third session will open at 9:30 o'clock Wednesday morning when addresses will be delivered on the following subjects:

"Who Should Pay the Expenses of a Representative from the Factory When Sent Out at Request of the Dealer to Help Close a Deal?"—F. L. Eberhardt, Gould & Eberhardt, Newark, N. Y.; C. H. Norton, Norton Grinding Co., Worcester, Mass.

"The Use of Ball or Roller Bearings in Machine Tool Construction."—Henry Hess, Hess-Bright Mfg. Co., Philadelphia.

"Advertising: Large Space in a Few Papers vs. Small Space in a Number of Papers."—Thomas H. Moore, advertising manager, John Wanamaker, Philadelphia.

"Concrete vs. Wood Flooring."—James N. Heald, Heald Machine Co., Worcester, Mass.

The fourth session will open at 2:30 o'clock in the afternoon, when these addresses will be presented:

"The Design and Construction of Machine Tool from the User's Standpoint."—C. K. Lassiter, mechanical superintendent, American Locomotive Co.; John Riddell, General Electric Co., Schenectady, N. Y.

RADIATOR COMPANY

Expected to Buy—Inquiries for Pig Iron More Numerous.

Pittsburg, Oct. 18. (By wire.)

Negotiations likely will be closed Friday of this week with a large radiator company for 7,500 tons of foundry pig iron for delivery at West Newton, Pa., and 3,500 tons for delivery at Corry. This iron is included in an inquiry for 42,000 tons put out recently. Inquiries for basic, malleable and Bessemer are heavier and the consumers appear to be anxious to close. Bessemer steel is quotable at $15. Unconfirmed reports of low prices on this grade are heard, but these are probably due to the low price established by recent sales of basic. There is now a spread of $2.00 between basic and Bessemer.

At the annual meeting of the Crucible Steel Co. of America stockholders, held Oct. 19, the retiring directors were re-elected with one exception, J. J. Lyon being succeeded by Geo. W. Crawford.

AMERICAN INSTITUTE ON ITS TOUR

Largest Inspection Party in History of American Industry Stops at Manufacturing Centers

The tour of members of the American Iron and Steel Institute and their distinguished foreign guests through the country, with stops in the principal manufacturing centers for plant inspection, is most noteworthy. It is the largest inspection party of iron and steel masters that ever traveled through the United States. Every arrangement conducive to comfort, convenience and thorough inspection of the works has been made, and the tour is surpassing even the lively expectations that had been raised concerning it.

The party left New York City last Sunday night. After spending Monday at Buffalo, it proceeded to Chicago, where two days were occupied. Today and tomorrow will be spent in Pittsburg, and the final stop of the trip will be made Saturday at ashington.

WHILE AT BUFFALO

Party Inspected Lackawanna Works and Points of Interest.

Buffalo, Oct. 17.

More perfect autumn weather could not be imagined than that which greeted the members of the American Iron and Steel Institute and their guests when they arrived at Buffalo today. It was 7:30 o'clock in the morning when the special train pulled into a siding at the plant of the Lackawanna Steel Co., and the first early risers who left their sleeping cars found the sun shining brightly through a light hazy mist, which cleared as the morning advanced.

Breakfast was served on the train, and as the steel men appeared, they were greeted by C. H. McCullough Jr., vice president and general manager of the Lackawanna Steel Co., who was on hand early to greet them. Meanwhile, a special car had left the city at an early hour, carrying local steel men and representatives of the Buffalo Chamber of Commerce, who turned out in large numbers to welcome the ironmasters. There was no formal speechmaking, but the steel men were given to understand that the city appreciated the importance of their visit.

As soon as the Buffalo men reached the Lackawanna Steel plant, the tour of inspection was begun. One of the company's trains was run up to the siding and every one boarded it, inlucding the two or three ladies, who accompanied their husbands. After the party had seen several coke ovens pulled and had a general view of the exterior of the plant, they went to the blowing engine house, in which the company takes much pride, for by the system employed there, it utilizes the waste gas of the plant to good advantage. Next they watched the manufacture of rails and in this the members of the party, who came from abroad, showed particular interest. They seemed impressed with the use of titanium alloy in the manufacture of Bessemer steel for rails, which is used at the Lackawanna plant.

By the time the rail making had been inspected, the morning was well advanced. On reaching the offices of the company, the ironmasters found a score of automobiles waiting for them, and they were whisked across the city to Black Rock. Although the new ship canal lock, which is in course of construction, was the real objective point, the party did not take a direct route. In fact it almost doubled on its course, in order to see as many of the beauty spots of the city as the limited time would allow. Whirling through the East Side, the visitors had an opportunity to see some of Buffalo's growing industries, and then in a few minutes the scene had been changed to the city's most beautiful residential streets. The steel masters saw Fort Porter, a United States army post; they ran along the Front, commanding a splendid view of Buffalo harbor; for half an hour they sped through beautiful streets, then got a flying glimpse of Delaware Park and the Albright Art gallery. The ship canal lock, which came last on the sightseeing program, is one of the largest of its kind and presents many interesting features from an engineering viewpoint. Commercially, it will be of the greatest value as a part of the improved canal system, which will greatly facilitate the shipment of iron to the east.

When the inspection of the lock was finished, the party boarded its special train, which had been run up to Black Rock from the steel plant, and proceeded to Niagara Falls. The trip took only 40 minutes and luncheon was served on the way. On arrival at Niagara Falls, the members of the institute were met by a delegation of city officials, and representatives of the big power companies on both the American and Canadian sides of the river. The afternoon was spent in observing the cataract, a trip around the gorge on trolley cars, and an inspection of the power plants. Early in the evening, the party continued its trip to Chicago by way of the Michigan Central railroad.

STOP AT CHICAGO

Included Visit to Gary and Notable Banquet.

Chicago, Oct. 19. (By wire.)

Eighty members of the American Iron and Steel Institute, with their guests and foreign visitors, arrived at Gary, Ind., over the Lake Shore railroad from Buffalo, at 7:30 a. m., yesterday. The train was parked in the yards at the plant of the Indiana Steel Co. After breakfast on board the special, the party was taken on an observation train for a thorough inspection of the great plant at Gary. All departments were visited, but particular interest was manifested in the gas engine department, the ore handling apparatus and the rail mill. The rail mill was operating at top speed, giving a graphic illustration of the rate at which finished material is turned out in American steel mills and all departments of the works were in exhibition form. The foreign iron masters were greatly interested in the operations at Gary, asked numerous questions and took copious notes.

Perfect mild, bright Indian summer weather greeted the visitors and the inspection of the Gary plant formed a fitting introduction to the iron and steel industries of the middle west.

At 11:30 a. m., the party was taken in automobiles over the business and residence portions of the city of Gary. The neat and prosperous appearance of the town created much favorable comment. Lunch was served en route on the special train from Gary to South Chicago, and the afternoon was spent in an inspection of the South Works of the Illinois Steel Co., at South Chicago. Here the plate mill, structural mill and Bessemer departments came in for a large share of attention.

A brilliant dinner held at the Blackstone hotel, last night, marked the climax of the tour of the central west. The banquet was in many ways one of the most significant ever held in Chicago. E. J. Buffington,

president of the Indiana Steel Co., was toastmaster, and about 150 prominent iron and steel men from all parts of the world attended, including the institute party with foreign guests, Governor Deneen, of Illinois, Cyrus McCormick, M. C. Armour, A. J. Earling, E. L. Ryerson, A. B. Scully, and many other Chicago men.

The keynote was sounded in a speech made by Judge Gary, who urged the necessity of right conduct in great business affairs. In part Judge Gary said:

It is time for all of us to take a decided stand in favor of right conduct on the part of every one concerning the great economic questions which involve the life, health, safety and happiness of the whole people. The influence of the Chicagoans present here tonight has been, and will continue to be, potential in this direction. With the firm belief in what I have suggested, I still think there is some danger of going beyond the bounds of necessity, propriety and reason in our efforts to correct abuses and to establish conditions which we deem proper.

The other guests who responded to toasts were: M. R. De Labriolle, director of the Steel company of France; George W. Perkins, of New York, the latter creating a diversion with an alleged prayer of Chicago men—"Oh Lord, we ask Thee not for riches, but simply to show us where they are;" Herr E. Schaltenbrand, of Dusseldorf, Germany; Judge C. C. Kohlsaat, Baron Von Bodenhausen, director of the Frederick Krupp Co., of Essen, Germany; Mons. L. Spaak, Sir John Randles, of Workington, Eng., and Sir Charles Allen, of Monmouth, Eng. Corporation Counsel Brundage, representing Mayor Busse, welcomed the visitors.

Tomorrow the plants of the International Harbester Co., the Pullman Co. and the Union stockyards will be visited, after which the members and their guests will board their special train for Pittsburg.

VISIT TO PITTSBURG

Will Prove Both Interesting and Entertaining.

The party will arrive in Pittsburg on Thursday morning, Oct. 20, on a special train from Chicago and will make its headquarters at the Hotel Schenley, while in that city. On Thursday morning the party will leave for a boat ride up the Monongahela river, stopping at the plants of the Jones & Laughlin Steel Co., Carnegie Steel Co., and other large industrial concerns. An informal dinner will be given at the Hotel Schenley, Thursday evening.

Friday morning will be devoted to an inspection of the Carnegie Institute and Technical schools. During the afternoon, the party will visit the plants of the Westinghouse interests at East Pittsburg. Another informal dinner will be given at the Hotel Schenley, Friday evening.

The committee having charge of arrangements for the entertainment of the party while in Pittsburg consists of W. L. King, vice president of the Jones & Laughlin Steel Co., chairman; A. C. Dinkey, president of the Carnegie Steel Co., and T. W. Guthrie, president of the Republic Iron & Steel Co.

At the National Capital.

The final stop of the tour will be made at Washington, Saturday, Oct. 22. The leading event of the stay in the capital city will be the reception tendered the members of the institute and their foreign guests by President Taft, at the White House, at 11 o'clock in the morning. The plants of interest which will be visited in Washington are the national capitol, the bureau of standards and the congressional library. The return trip will be made to New York Saturday night.

COAL AND COKE SHIPMENTS.

The statement of coal and coke shipments originating along the lines of the Pennsylvania Railroad Co., east of Pittsburg, for the month of September, shows: Anthracite coal, 804,214 tons, a decrease of 7,559 tons; bituminous coal, 3,527,204 tons, an increase of 40,403 tons; coke, 931,965 tons a decrease of 204,287 tons; total, 5,263,383 tons, a decrease of 171,443 tons. From Jan. 1 to Sept. 30 the statement shows: Anthracite coal, 8,039,277 tons, an increase of 114,313 tons; bituminous coal, 30,320,993 tons, an increase of 2088,139 tons; coke, 10,192,013 tons, an increase of 4,240,836 tons total 48,552,283 tons, an increase of 4,240,836 tons.

WAS CHOSEN PRESIDENT.

James I. Stephenson was recently elected president of the Cincinnati Iron & Steel Co., succeeding E. H. Busch, deceased. H. C. Busch was elected vice president at the same special meeting of the directors. Mr. Stephenson six years ago resigned the position of assistant manager of sales for the Carnegie Steel Co. in the Cincinnati district, to become vice president of the Cincinnati Iron & Steel Co.

ELECTRICAL ENGINEERS

Elected Officers and Heard Papers at Pittsburg Meeting.

The fourth annual convention of the Association of Iron and Steel Electrical Engineers, which opened at the Hotel Schenley, Pittsburg, on Monday, Oct. 17, with about 65 members present, will end today. A day and a half of the convention was devoted to the discussion of safety devices and methods of prevention of accidents. Several interesting reports were read, and Dr. W. H. Tolman, director of the Museum of Safety, New York City, delivered a lecture Tuesday evening at the Carnegie Institute on "Safety." The following officers were elected:

President, L. R. Palmer, safety engineer Jones & Laughlin Steel Co.'s Southside (Pittsburg) works; first vice president, B. R. Shover, electrical engineer Carnegie Steel Co.'s works, Youngstown, O.; second vice president, C. W. Parkhurst, electrical engineer Cambria Steel Co., Johnstown, Pa.; secretary, James Farrington, superintendent of the electrical department of La Belle Iron Works, Steubenville, O.; treasurer, E. W. Yearnsley, electrical engineer of the Midvale Steel Co., Philadelphia, Pa.

Following the reading of reports by the different officers on Monday, the report of the standardization committee, of which L. R. Palmer is chairman, was read. The report of the Safety committee, of which B. R. Shover is chairman, was read Tuesday afternoon. Practically all of Wednesday was devoted to a general discussion of reports read by safety committees on "Safety for Electric Traveling Cranes" and "High Voltage Protection."

Representatives of the following companies will deliver short talks today: Electric Controller & Mfg. Co.; Adams-Bagnell Co.; Westinghouse Electric & Mfg. Co.; Cutler-Hammer Mfg. Co.; Crocker-Wheeler Co.

ISSUED SCRAP LIST.

Chicago, Oct. 18.

The Chicago, Milwaukee & St. Paul Railway Co. has issued a scrap list amounting to 2,170 tons, on which bids will close Friday, Oct. 21. The principal items in the list are 750 tons of old steel rails, 4 feet and over, and 500 tons of No. 2 railroad wrought. This is the second list issued by the St. Paul this month.

The first cast from the open-hearth furnaces of the Forged Steel Wheel Co., Butler, Pa., was made Oct. 12. It will be some weeks before the mill is ready.

BRIGHTER PROSPECTS

For More Active Railroad Buying—Steel Rail Sales.

New York, Oct. 19. (By wire.)

There are clearer prospects and tangible evidence that railroad buying of iron and steel products is slowly changing for the better. Car inquiries include 1,000 for the Delaware, Lackawanna & Western, and 500 for the Norfolk & Western, while figures on steel are also being taken for additional cars for the New York Central. The Pennsylvania Steel Co. has sold about 6,000 tons of rails to the Pinkerton Construction Co., and 500 to another contractor. The Tennessee Coal, Iron & Railroad Co. reports 700 tons of open-hearth rails, sold to a contracting firm and the Illinois Steel Co. 11,000, including 10,000 to the Mackenzie-Mann Syndicate for a Canadian line, previously reported.

Steel companies have been asked for prices for two United States battleships soon to close and which will require about 12,000 tons of steel each. One ship will be built by the government. The battleship for Chili, previously referred to, will close Oct. 30, requiring 10,000 tons, and American builders are interested. The first bids on New York subway construction go in tomorrow and the second form in one week.

CAST IRON PIPE

Will be Made by Car Company in Detroit.

New York, Oct. 19. (By wire.)

The city of Detroit has awarded 5,600 tons of cast iron pipe to the American Car & Foundry Co., which will manufacture the lot in one of its foundries there, which is equipped for such work and occasionally books such orders. The incident reflects the present lack of sufficient business to engage plant capacity of car builders.

The Republic Iron & Steel Co. held its annual meeting in Jersey City today, and elected four directors, together with transacting routine business.

MACHINE TOOL BUILDERS AND SELLERS ASSOCIATED.

An association of interests in the manufacture and sale of machinery and machine tools has been announced by the Gisholt Machine Co., Madison, Wis., and Joseph T. Ryerson & Son, Chicago. This announcement is of particular interest on account of the establishment of an intimate relationship between a leading general machinery organization and one of the country's best known machine tool manufacturers.

In furtherance of plans formulated on account of the consolidation, extensive additions will be immediately made to the Gisholt plant at Madison which will greatly increase the output and scope of the tool building establishment.

MOST SUCCESSFUL

Was Chicago Meeting of Electro-Chemical Society.

The American Electro-Chemical Society closed its eighteenth general meeting at Chicago, Saturday, Oct. 15. The final meeting and discussion of papers was held Saturday morning in the Florentine room of the Congress hotel. Prof. James Austin, of the Wisconsin University, read a paper on the "Physical and Magnetic Hardness of Some Electrolytic Iron Alloys." Saturday afternoon was devoted to excursions to the power plants operated by the Sanitary District and to the Field Columbian Museum.

The meeting just closed was one of the most successful in the history of the society. About 150 members and visitors attended. The professional sessions were presided over by William H. Walker, Ph.D., Boston, president of the society. An interesting feature of the program was an impromptu paper on "The Hiorth Electric Steel Furnace," which was read by Prof. Joseph W. Richards, of Lehigh University. Three mornings were devoted altogether to the reading and discussion of papers and the corresponding afternoons to excursions to various plants of interest about the city, including the steel plants at South Chicago and Gary.

Personal.

E. R. Evinger, formerly with The National Automatic Tool Co., of Richmond, Ind., has accepted the position of superintendent of The Miami Valley Machine Tool Co., of Dayton, O.

John Woodward, general manager of the Leetonia Boiler Co., at Leetonia, O., has resigned to accept a position as general manager of the Tulsa Boiler & Mfg. Co., at Tulsa, Okla.

James A. Campbell, president of the Youngstown Sheet & Tube Co., has been elected a member of the board of directors of the Lackawanna Steel Co. It is said that Mr. Campbell will also be a member of the advisory committee.

T. H. Benners has been chosen chairman of the board of directors of the Stockham Pipe & Fittings Co., Birmingham, Ala. The election of Mr. Benners is said to be for the purpose of permitting him as chief executive to test the facilities of the plant with a view to further financing it. Mr. Benners has announced that operations will be continued as heretofore.

E. Lee Norton has been elected treasurer of the J. I. Case Threshing Machine Co., of Racine, Wis., to succeed the late Charles L. McIntosh, Milwaukee, who died in Italy. C. J. Farney was elected a director to succeed Mr. McIntosh, and was also elected to the office of general sales manager. R. B. Coleman has been elected general collection manager. G. B. Voorheis, who has been in charge of the company's Canadian business, has been appointed manager of the advertising department.

IN CHICAGO

National Founders' Association Will Hold Convention.

On Wednesday and Thursday, Nov. 16 and 17, the National Founders' Association will hold its fourteenth annual convention at the new Hotel LaSalle, Chicago. These two days will be devoted to the business sessions of the convention, and several prominent speakers have been engaged for the occasion of the annual banquet, which is to be held on the evening of Nov. 16. They are: President Cyrus Northrup, University of Minnesota, and Congressman Frank N. Nye and Frederick C. Stevens, of Minnesota.

Obituary.

Henry Bowen Stimson, for years identified with iron and foundry interests, is dead at his home in Buffalo, after a long illness. He was for a long time manager of the Buffalo Steam Forge Co., and later formed a partnership with Charles A. Gould, under the name of Gould & Stimson. For some time past he ran a plant of his own.

Cyrus H. Woodruff, a wealthy pioneer manufacturer of Illinois, and organizer of the Illinois Iron & Bolt Co., of Carpentersville, died at his home in Carpentersville, Ill., on Oct. 12, aged 91. Mr. Woodruff entered the foundry business in Illinois in 1851. Although retired for a number of years, he owned a large foundry in Elgin, besides considerable stock in the Carpentersville plant. He was born at West Stockbridge, Mass.

IRON AND STEEL SECURITIES

Trading on the New York stock exchange last week showed greater activity than at any other time since the close of July. Toward the latter part, prices were moving upward and gains among standard issues extended to three and four points. With but few exceptions iron and steel issues closed the week with gains.

Monday, the market was firm and prices averaged higher; government reports showed record-breaking crops in corn, wheat and oats. Tuesday, the market was firm, active and higher; copper metal was firmer and copper stocks higher. Wednesday, the markets closed on account of Columbus Day; in London, consols closed ⅛ lower, while Steel common closed 1⅛ higher. Thursday stocks were active and prices advanced to the highest average on this movement; cotton was firmer but wheat and corn declined. Friday sales reached 965,000 shares; prices advanced to the highest average since early in the summer; copper metal was reported slightly higher; grain markets declined to lowest prices since last June. Saturday, the market continued active and buoyant.

Call money for the week ranged from 1½, the lowest of the month, to 3½ and then to 3¾ per cent, but was slightly easier the last of the week. Time money was higher at the close of the week, due to an increased demand. The actual figures of clearing house banks showed loans decreased $19,226,600; deposits decreased $19,730,200; reserve decreased $750,100; surplus increased $4,182,450. Non-member banks and trust companies showed loans and investments increased $12,382,000; net deposits increased $12,120,400, and the percentage of reserve 17.6, compared with 17.9 previously. Bank clearings fell 14 per cent below last year. Commercial failures for the week were 257, compared with 207 the preceding week, and 242 the corresponding week last year. Shares were sold to the number of 2,704,150, compared with 1,791,600 the preceding week, and 4,084,900 the corresponding week last year. Bonds, exclusive of government bonds, were sold to the amount of $12,835,000, compared with $11,715,000 the preceding week, and $16,810,000 the corresponding week last year.

	Closing Quo. Oct. 15	Changes in week	Annual Meeting Date 1910	Stock Outstanding	Basis	Dividend Last	Dividend Div. Date	Dividend Pay. Last
Allis-Chalmers	10⅛	+ ⅛		$19,820,000				
Allis-Chalmers, pr	33½	— ⅛		16,150,000	7 cum.	1¾ Q.	Feb.,	1904
American Can	9⅛	+ ⅞	Feb. 2	41,233,300		1¾ Q.		
American Can, pr	70	+1¼		41,233,300	7 cum.	1¾ Q.	July,	1910
Am. Car & Fdy	54½	+5½	June 24	30,000,000		½ Q.	Oct.,	1910
Am. Car & Fdy. pr	116	+1½		30,000,000	7 n. c.	1¾ Q.	Oct.,	1910
American Loc	41½	+4⅜	Oct. 18	25,000,000	5	1¾ Q.	Aug.,	1908
American Loc, pr	105	+2		25,000,000	7 cum.	1¾ Q.	Oct.,	1910
American Ship	79	.....	Oct. 12	7,600,000	4	1 Q.	Sept.,	1910
American Ship, pr	108	.....		7,900,000	7 cum.	1¾ Q.	Oct.,	1910
Am. Steel Foundries(new)	45	+1⅜	Dec. 1	17,184,000		1¼ Q.	Aug.,	1910
Barney & Smith	25	.....	June 7	2,000,000	4	1 Q.	Dec.,	1907
Barney & Smith, pr	95	+20		2,500,000	8 cum.	2 Q.	June,	1908
Bethlehem Steel	29⅞	+1½	April 5	14,862,000		.....	.....	
Bethlehem Steel, pr	59½	+1⅛		14,908,000	7 n. c.	¾ Q.	Feb.,	1907
Cambria Steel	44¼	+2⅜	Mar. 15	45,000,000	5	1¼ Q.	Aug.,	1910
Cambria Iron	45	.....		8,468,000*	4	2 S. A.	Oct.,	1910
Chicago Pneumatic Tool	42	+1½	Feb. 21	6,485,800	4	1 Q.	Oct.,	1910
Colorado Fuel	35¼	+2¼	Oct. 17	34,235,500		1¼ Q.	Apr.,	1902
Crucible Steel	12⅞	+ ¾	Oct. 19	24,578,400		3½.	.....	
Crucible Steel, pr	78¾	+2¼		24,436,500	7 cum.	1¾ Q.	Sept.,	1910
Empire Steel	10	.....	Feb. 23	1,254,770		.....	.....	
Empire Steel, pr	55	.....		2,500,000	6 cum.	3 S. A.	July,	1910
Fay & Egan	70	.....	Feb. 15	1,000,000	6	3 S. A.	Feb.,	1909
Fay & Egan, pr	115	.....		1,000,000	7 cum.	1¾ Q.	Sept.,	1910
General Electric	155	+4¼	May 10	65,179,600	8	2 Q.	Oct.,	1910
Harbison Walker	32½	.....	Jan. 17	18,000,000		½ Q.	Aug.,	1910
Harbison-Walker, pr	93	.....		9,600,000	6 cum.	1½.	Oct.,	1910
International Pump	44	+1¼	May 10	17,762,500		1 Q.	Nov.,	1910
International Pump, pr	84	— ⅜		11,350,000	6 cum.	1½ Q.	Aug.,	1910
Lackawanna Steel	38½	.....	Mar. 9	34,978,000		.....	.....	
Lake Sup. Corp	24½	+ ½	Oct. 5	40,000,000		.....	.....	
New York Air Brake	79	+2	June 16	10,000,000	8	1½ Q.	Oct.,	1910
Niles-Bement-Pond	98	.....	Feb. 2	8,500,000	6	1½ Q.	Sept.,	1910
Niles-Bement-Pond, pr	104	.....		2,000,000	6 cum.	1½ Q.	Aug.,	1910
Otis Elevator Co	45	.....	Mar. 21	6,375,000	3	1½ S. A.	Oct.,	1910
Otis Elevator Co., pr	91	.....		6,310,000	6 n. c.	1½ Q.	Oct.,	1910
Pa. Steel	60	.....	May 9	10,750,000		.....	.....	
Pa. Steel, pr	110	+ ½		16,500,000	7 n. c.	3½ S. A.	May,	1910
Pittsburg Coal Co	20½	+3	Mar. 8	28,104,600		.....	.....	
Pittsburg Coal Co., pr	70⅝	+2⅜		27,071,800	7 cum.	1¼ Q.	Oct.,	1910
Pressed Steel Car	36¼	+3	Feb. 16	12,500,000		1 Q.	Aug.,	1904
Pressed Steel Car, pr	96¾	+1¼		12,500,000	7 n.c.	1¾ Q.	Aug.,	1910
Pullman	164	+1	Nov. 9	120,000,000	8	2 Q.	Aug.,	1910
Railway Stl. Spring	38	+4	Mar. 3	13,500,000	2	1 S. A.	Oct.,	1908
Railway Stl. Spring, pr	93¾	+3½		13,500,000	7 cum.	1¾ Q.	Sept.,	1910
Rep. Iron & Steel	34½	+3½	Oct. 19	27,191,000		.....	.....	
Rep. Iron & Steel, pr	96⅞	+3⅞		25,000,000	7 cum.	1¾ Q.	Oct.,	1910
Sloss-Sheffield	56	+5	Mar. 9	10,000,000	5	1¼ Q.	Sept.,	1910
Sloss-Sheffield, pr	114½	.....		6,700,000	7 n. c.	1¾ Q.	Oct.,	1910
U. S. Pipe & Fdy. Co	17½	+1½	June 22	12,106,300	2	1 Q.	Dec.,	1907
U. S. Pipe & Fdy. Co., pr	57¾	.....		12,106,300	7 n. c.	1¾ Q.	Sept.,	1910
U. S. Steel	76⅛	+6¼	April 18	508,302,500	5	1¼ Q.	Sept.,	1910
U. S. Steel, pr	120	+1½		360,281,100	7 cum.	1¾ Q.	Aug.,	1910
U. S. Steel 5s	104¼	+ ⅛		463,798,000	5	.....	.....	
Va. Iron, Coal & Coke	59	+9	Sept. 20	9,073,680		5. †	Oct.,	1907
Westinghouse Elec	72¼	+¾	July 27	3,998,700*		10½Q.**	Oct.,	1910
Westinghouse Air Brake	141¼	+2¾	Oct. 4	13,750,000*		5 Q. ‡	Oct.,	1910

Par value of shares, $100, except those starred (*), $50.
**Includes 8¾ per cent on back dividen ds.
†Stock.
‡Includes 1½ extra and 1 special.

Copper Stocks.

New York.—Amalgamated copper closed at 70, a net gain of 3⅝.

Boston.—Butte Coalition closed 20, a net gain of ¼; Calumet & Arizona closed 60, a net gain of ¾; Calumet & Hecla closed 550, unchanged; North Butte closed 33, a net gain of 2½; Quincy Mining closed 76, a net gain of 4.

Financial Notes.

The Pittsburg Malleable Iron Co. has declared the regular quarterly dividend of 2½ per cent, payable Oct. 20.

Through what is said to be a compromise, molders who struck at the Florence, Ala., shops of the Theoele-Phillips Mfg. Co. and the Cohen Stove & Foundry Co., will return to work. The adjustment came about after the molders' union southern organizer conferred with both sides at Florence last week.

THE IRON TRADE REVIEW

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THE AVERAGE PAID CIRCULATION OF THE IRON TRADE REVIEW FOR THE ISSUES OF THE FOLLOWING MONTHS WAS:

January, 1910	5,681
February	5,703
March	5,754
April	5,793
May	5,827
June	5,842
July	5,864
August	5,875
September	5,895

October 20, 1910

STATESMANLIKE BUSINESS.

The significance of the meeting of the American Iron and Steel Institute with representatives of some of the greatest iron and steel manufacturing companies of foreign countries does not lie merely in the fact that these leaders of industrial affairs in other countries have come to the United States. Similar visits have been made in past years, notably when the Iron and Steel Institute made American tours in 1890 and 1904. This latest visitation is unique and more important than others because greater emphasis is being placed upon the importance of world-wide co-operation in order to bring about on this earth a reign of better conditions in business affairs.

The able address of Judge Gary, delivered last Friday, to the assembled members and guests, is a statesman-like document, and presents most clearly the purposes and possibilities of the new Institure. We hear much nowadays of the evils resulting from the partnership of big business and corrupt politics, but, however objectionable that combination may be, it is most desirable to have statesman-like men in business, and to have business affairs conducted in accordance with the broadest principles of justice. Judge Gary is pre-eminently a statesman in business. More than any other man who has been connected with the manufacture of iron and steel, he is giving prominence to ethical questions, and in his address he shows the importance of so conducting business affairs that they can not conflict with principles of fair dealing. He speaks, not only for the manufacturer, but with much feeling for the employe, and also shows very clearly how the customer as well as the manufacturer and workingman suffers when ethical considerations are disregarded.

One of the strongest features of Judge Gary's address is that in which he takes up for consideration the argument so often made after the panic of 1907, that to attempt in any way to prevent a slaughter of prices would be to interfere with the laws of nature. During the days when Judge Gary and his associates of the Steel Corporation and independent companies were endeavoring to maintain prices and prevent the ruin of many who had large supplies on hand, it was frequently asserted that such attempts violated laws of nature and could not succeed. The efforts did succeed, however, to a very large extent, and Judge Gary shows that the law of supply and demand was not violated. He might, it seems to us, have even granted that if what had usually been considered the law of supply and demand had been violated, it was justified, just as man is justified in protecting himself against pestilence or anything else that prevails in accordance with what men in earlier ages considered the laws of nature.

Judge Gary's explanation that it is not necessary to make agreements in order to maintain a fair and just equilibrium shows that there is a medium ground between the price wars of the past and illegal agreements. The mere fact that men get together, that they tell each other honestly what they are doing, and that they are willing to co-operate, will have a most wholesome effect. In the language of Judge Gary:

"Real, hearty, cheerful and continued co-operation on the part of the members will secure results which should be entirely satisfactory. Frank and friendly intercourse; the full disclosure of his business by each to the others, recognition by all of the rights of each; the disposition to assist and benefit each other so far as practicable and profitable; conduct founded on the belief that healthy competition is wiser and better than destructive competition; all these are desirable and necessary, and will be effective."

THE RELATIVE INCREASE IN WIRE TONNAGE.

The statistics of wire rod production in 1909 were given in a recent issue, having just been compiled by the American Iron and Steel Association. The gain in 1909 over 1906 was 25 per cent, and over 1907 15 per cent, remarkable gains considering that pig iron production in 1909 gained only 2 per cent over 1906, and only six hundredths of 1 per cent over 1907. Rod output, then, has gained greatly as compared with other iron and steel products, considered as a whole.

The rod statistics are an accurate index to wire production, because the tonnage of rods used for purposes other than wire drawing is small, and the loss from the rod to the finished wire product, whether smooth wire for commercial purposes, wire nails, wire fence, etc., is very small.

From 1889 to 1909, 20 years, rod production increased from 363,851 tons to 2,335,685 tons, more than sextupling, as the percentage of increase was 542 per cent. It is generally recognized that the average increase in iron and steel tonnage, as measured by pig iron production, is a doubling, on an average, each decade, so that rods have done much better than the average. In the early days, however, there was a growth in

wire production due to the special condition that the wire nail was supplanting the cut nail, and continued growth from this cause could not be expected, because once the cut nail was supplanted the influence could not continue. In 1888 the production of cut nails was 6,493,591 kegs, equivalent to about 300,000 gross tons of nail plate, the product cognate with wire rods. Four years later, in 1892, nail plate production had dropped to 200,000 tons, and three years later, in 1895, it had dropped to less than 100,000 tons. On this particular account, rod production gained much more rapidly than other products during the industrial depression of 1893-8.

Many years ago predictions were made that ultimately the tonnage of wire rods would exceed the tonnage of rails. This prediction has not been verified, but progress has been made. It is interesting to compare rod statistics with those of rails and structural shapes, and it is very instructive also, for information as to trends can be obtained by comparing the tonnages of products so utterly different in their characteristics and the manner of their use. In the accompanying table are given the rod statistics from 1888, the year for which they were first compiled, the rail production for the same years, and the statistics of shapes from 1892, the first year for which they are available.

Wire is one of the most perishable of iron and steel products, perhaps yielding in this respect only to tin plate among the important products. Structural steel is by all odds the most lasting, whether in the form of bridges or buildings, and when ultimately it is replaced, the cause is usually extraneous, as the need of a stronger bridge or increased value of land whereby it will bear a larger and more expensive building. Nevertheless, wire rod and structural shape production have increased in much the same manner, although shapes have gained somewhat more than rods, for in recent years they have been but little behind, while in the late 90's rods had a very comfortable lead.

There appears in the statistics a result of the difference between wire and structural steel, in that wire is an article of steady and regular consumption, while structural steel goes into projects which must be financed, so that in periods of depression the structural industry suffers much more than the wire industry. This is illustrated strikingly by the "off" years 1904 and 1908. Through 1903 and 1904 rod production gained steadily, but structural shape production slumped. In 1908 rod tonnage decreased 10 per cent, while structural shape tonnage decreased 50 per cent.

The race between rods and rails has been more or less exciting. In the early years of our table, say from 1888 through 1892, the railroads had money to spend, and were relatively liberal in the building of new track and in the replacement of old and light rails, iron rails in many cases, with new heavy sections of steel rails. In those years rail tonnage was several times that of rod tonnage. In the industrial depression, the great period of receiverships for railroads, rail tonnage decreased while rod tonnage increased, rod tonnage being roughly about 60 per cent of rail tonnage. With the great jump in rail production in 1899, due largely to the very low prices made in the historic rail war late in 1898, a greater lead was established, rail production being more than double rod production, and this condition continued, except in the minor depression, through 1906, in which year rods showed 1,871,614 tons and rails 3,977,887 tons. Since that year rail production has declined and rod production has increased. There was a close approach in 1908, with 1,816,949 tons of rods and 1,921,611 tons of rails. Excluding light rails, which are a separate product as regards the conditions of their use, the rod production of 1908 exceeded the production of standard rails.

In some quarters the suggestion has been made of late that the large increase in rod and wire capacity now being made is not entirely warranted by industrial conditions, but the rapid growth of rod output from 1906 to 1907 and then to 1909, when production as a whole was practically stationary, gives indication that the growth of demand for wire is of a special nature and therefore promises a continuance.

The report of the Federal Mining & Smelting Co. for the year ending Aug. 31 last shows net earnings of $743,808, a decrease of $156,452. Payment of preferred dividends required $839,027, leaving a deficit of $95,219.

Sheet Production

For 1909 Announced by American Iron and Steel Association.

The production of black plates, or sheets, for tinning together with the output of tin plates and terne plates in the United States in 1909 have been compiled and just published by the American Iron and Steel Association. The production of black plates for tinning in 1909 amounted to 606,844 gross tons, compared with 513,771 tons in 1908, an increase of 93,073 tons, or over 18.1 per cent. The 1909 production was by far the largest in the history of the American industry. Of the total production in 1909, Pennsylvania made almost 51 per cent, compared with 54.1 per cent in 1908, and other states rank in this order: West Virginia, Ohio, Indiana, Illinois and Maryland. Of the total 1909 production, 4,261 tons were rolled from iron, compared with 2,954 tons in 1908; and 602,583 tons from steel, compared with 510,817 tons in 1908. In 1909 there were 31 active black plate works, compared with 28 the preceding year and 31 in 1907.

The production of tin and terne plate in 1909 was 1,373,011,000 pounds or 612,951 tons. This compares with 1,203,075,000 pounds or 537,087 tons in 1908, an increase of 75,864 tons. Of the total in 1909 1,182,081,000 pounds were tin plate, an increase of 133,185,000 pounds compared with the 1908 output; and 190,930,000 pounds were terne plate, an increase of 36,751,000 pounds compared with 1908.

Labor Notes.

The last of the strikes of the Sons of Vulcan was called off when about 200 members of this organization reported for work in the puddling department of the Lockhart Iron & Steel Co.'s plant at McKees Rocks, Pa., Monday morning. The company also employes about 75 members of the Amalgamated Association of Iron, Steel and Tin Workers. Heretofore this company employed only members of the Sons of Vulcan, but when this organization called a strike on July 15 of this year, the company signed the Amalgamated Association scale.

The strike at the Warren, O., plant of the Warren City Tank & Boiler Co., in which employes sought a 10 per cent wage advance and recognition of the union, has been settled. The union is recognized, but the wages are unchanged.

Something like 200 molders employed by the Wehrle Co., Newark, O., in its stove works, walked out, Oct. 11, complaining that several working shop conditions are sufficient cause for grievance.

STEELMAKERS' INTERNATIONAL GATHERING

World's Steel Trade Relations Discussed at Notable Meeting of the American Iron and Steel Institute

Co-operation rather than destructive competition to insure the stability of the iron and steel industry, all over the world, was the sentiment reiterated in every response at the annual banquet

Uniting the iron and steelmakers of the old and new world in bonds of closer friendship and in more practical trade relations through the discussion of the broader aspects of the industry, the first formal meeting of the American Iron and Steel Institute, held at the Waldorf-Astoria, New York City, Friday, Oct. 14, struck a new note in the commerce of two continents, if not of the entire world. Never has a more representative body of iron and steelmakers of the two hemispheres gathered upon common ground, and with such fidelity of purpose to consider and conciliate, to consult together and to co-operate in the problems of productive enterprise, than graced this meeting of men of large affairs. Twenty-seven steel masters of Great Britain and Continental Europe, representatives of national progress, were guests of honor at the meeting and lent their cordial co-operation and advice in the discussion of subjects of vital importance to the international steel trade.

World-wide application was given to the doctrine of the maintenance of stability in all branches of the iron and steel industry, by the expressions of both the American and foreign steel manufacturers. The importance of the even and continuous activity of trade for the common benefit of the manufacturer, employe and consumer, to the permanent advantage of the entire industry, was emphasized in the addresses and discussions. To this end, a closer and franker co-operation of the iron and steelmakers of the world, in a spirit of broad conciliation, was urged, and the hope was voiced that through the instrumentality of the American Iron and Steel Institute, this movement may be advanced and eventually realized in a practicable form.

Judge Gary's Address.

Addressing two hundred or more representatives of the iron and steel industry of the United States, Great Britain, Germany, France, Belgium and Austria, when he called to order the first formal meeting of the American Iron and Steel Institute in the Myrtle room of the Waldorf-Astoria, at 11 o'clock, Friday morning, Oct. 14, Judge Gary said:

"At this first formal meeting of The American Iron and Steel Institute, it is my privilege, and no less my pleasure, to felicitate the members on the success which has already been reached as the result of an earnest and untiring effort on the part of each to engender a feeling of affection amongst the members and to promote the welfare of the Institute, regardless of any personal or selfish interest. The disposition you have shown, if maintained, will result in benefits that cannot at this time be measured. Especially are we to be congratulated that so many from foreign countries are with us. We realize that these visitors are men of important affairs, and have in their charge and control properties and business of great magnitude, which they could not leave even for a short time without considerable sacrifice. We understand they are here to evidence a desire, so far as practicable, to work with us in the endeavor to better the conditions of all.

"In behalf of the Institute, I bid these foreign gentlemen thrice welcome. We are delighted with their presence; and we are proud of their acquaintance. We offer to them our congratulations for their achievements in their own respective countries, personally and as representatives of large aggregations of wealth and business. With no spirit of envy do we read of their prosperity. For many years we have been learning from them, adopting their discoveries and their methods. It shall ever be our aim to co-operate with them in placing and keeping upon a better basis the lines of business in which we are engaged, and in cementing the friendship which exists and which we hope may be permanent, not only as between them and ourselves, but as between their countries and our country. Before their departure we hope to give them proofs of the sincerity of our professions of esteem.

Iron and Steel Production.

	Tons.
The production of iron ore in the United States and Canada during the year 1880, using in all cases round numbers, amounted to....	7,000,000
In 1890	16,000,000
In 1900	27,500,000
In 1909	53,000,000
Pig iron:	
In 1880	4,000,000
In 1890	9,000,000
In 1900	14,000,000
In 1909	26,500,000
Steel:	
In 1880	1,250,000
In 1890	4,300,000
In 1900	10,000,000
In 1909	25,000,000

"The increase in the production of steel did not correspond with the increase in the production of pig iron for the obvious reason that a good deal of scrap was melted, and, therefore, iron was used the second time.

	Tons.
The production of coke in 1880 amounted to	3,500,000
In 1890	11,500,000
In 1900	20,500,000
In 1909	41,000,000

Future Production.

"If the ratio of increase during the next 20 years should be the same in each decade over production at the close of the preceding decade as that which took place in the 10 years from 1900 to 1909, there would be produced of

	Tons.
Iron ore, in 1920	102,000,000
In 1930	197,000,000
Pig iron, in 1920	50,000,000
In 1930	94,500,000
Steel, in 1920	62,500,000
In 1930	156,000,000
Coke, in 1920, ...	82,000,000
In 1930	166,000,000

"As the figures given commence from a low basis in 1880, it is probable the ratio of increases for the next 20 years is not justified. However, if the increase in tonnage during that period shall be the same in each decade over the production at the close of the preceding decade as that which took place in the ten years from 1900 to 1909, inclusive, then and on that basis the production of

	Tons.
Iron ore in 1920 would be.....	78,500,000
In 1930	104,000,000
Pig iron, in 1920	39,000,000
In 1930	51,300,000
Steel, in 1920	40,000,000
In 1930	55,000,000
Coke, in 1920	61,500,000
In 1930	82,000,000

"Reference has been made to the magnitude and growth of the iron and steel industry of America, as evidenced by these figures, for the purpose of emphasizing the importance and the opportunities of the American Iron and Steel Institute, and the necessity for its existence.

Other Associations.

"There have been for some time other associations which were calculated to develop and improve the iron and steel industry by the accumulation and distribution of statistics, or by the study and discussion of numerous technical questions, and these associations have been very successful and satisfactory; but it has been felt they were not, in practice, at least, of sufficient scope and breadth to fully cover all the necessities of those who are engaged in, or connected with, the iron and steel trade. Due credit has been, and will be, given to those organizations; and there is no disposition to antagonize, or interfere with, or detract from, any of them. On the contrary, we hope, directly or indirectly, to affiliate with them and assist in the good work in which they are engaged.

"It seemed to the great army of individuals who have been particularly interested in successfully conducting this branch of industry that they had not prior to the formation of this Institute a common meeting place where it would be appropriate to consider any and all of the important questions which apply to their lines of activity. In some respects at least, methods had theretofore been unsatisfactory. Each individual was to some extent managing his affairs without regard to the rights or interests of others. The results are well known, and have been so frequently referred to as to make it unnecessary to dwell upon them at this time. That it was essential to do something to change and improve these conditions, we all insist.

"And so this institution was created upon a basis so broad that there is no limit to the good which may be accomplished. Its object is to afford means of communication between members of the iron and steel trades upon matters bearing upon their business affairs. Of course, this does not mean the undue advancement of the claims of any member to the prejudice of other members or of any one outside.

Ethical Questions.

"As stated by many of you during the period of formation of the Institute, it is intended that ethical questions shall be considered as important as economic or scientific questions. The rights and duties of each member, so far as his conduct relating to this particular department of industry is concerned, and within the lines of propriety, should always be matters for the deliberation of the whole membership of the Institute. The level occupied by the Institute is high, and its management must always be above reproach; and in all the questions which may properly be considered by the Institute the pecuniary interest and the honor of each member are alike involved.

"These general references are made because they are in accordance with the pronounced opinions of the charter members, and should be emphasized at the outset.

"Primarily the Institute was organized, and should be conducted, for the benefit of its members. It should result in decided pecuniary advantage to all. The opportunities for presentation and discussion of economic or scientific questions are likely to give all a clearer understanding of all the facts and circumstances applicable to the management of the factories, and furnaces, and mills, and their connections, so that every one possessed of the necessary knowledge may deal with reference to the rights of all concerned.

"Also, the consideration and discussion of ethical questions particularly affecting those outside of the membership, but connected with or interested in the conduct of their affairs, should be deemed just as essential and should result in material benefit to all.

"There are many subjects of importance in which as members of the Institute we are concerned, and they should be discussed; but a few only can be referred to in this address.

Stable Conditions.

"One of the most important business matters at this time, and perhaps at all times, is the maintenance of stable conditions in the iron and steel industry; and to this is attached the question of prices. For periods, at least, in the past, unsatisfactory conditions have been the rule and not the exception. Violent, sudden and wide fluctuations in prices have occured, and they have been detrimental to every one connected with the business, and to the public generally. The steel and iron industry, more or less recognized as the barometer of trade, has had an influence on general conditions for good or bad, and much of the time for bad. We do not, and never have, advocated fixed, unchangeable prices. If they are unreasonably high, they should be lowered, and vice versa. If for any good reason at any time we are convinced that the rights and interests of ourselves, our employes, or our customers, demand decreases in selling prices, or the readjustment of prices, we should be prompt to make them. This does not, however, militate against the general proposition in favor of stability as opposed to demoralization. We know, as a matter of fact, from most careful observation and an abundance of testimony from those directly affected, that the maintenance of fair prices and the prevention of sudden and wide fluctuations are desired by our customers themselves. If you suggest that many members of this Institute are purchasers or consumers of the commodities produced by others and therefore may object to the position taken, the obvious answer is, that they do not object. Many of them purchase with the view of converting or refining and selling the product. Many have stocks of materials on hand from time to time, and cannot afford, and do not desire, to have the values of inventories reduced. Besides, consumers like to feel that they can depend upon prices which they pay as being as low as the prices which their neighbors subsequently pay. We are all purchasers and consumers of one thing or another. We sell certain manufactured products; but we buy a greater variety of products; and we like to feel that we are at all times treated as our neighbors are treated. If we go to the tailor, the butcher, the grocer, the farmer, the railroad company, the steamship line, the telegraph office, the newspaper office, or any others having for sale that which we need and buy, we are better satisfied if we are certain we are treated like our neighbors, and that there will be no sudden and material decrease immediately after we have bought and before we have had opportunity to consume the product which we have purchased. It is pleasing to note that in much of the business transacted in this country, commercial, financial and industrial, there is a tendency towards an even, steady and continuing basis of action. It would be better for us all, and better for the country, if conditions in all departments of business were more stable and less likely to be disturbed by agitation, doubt or distrust.

Not Contrary to Natural Laws.

"It has sometimes been urged that an effort to maintain reasonable prices for iron and steel is contrary to the natural laws of trade; that it is opposed to the law of supply and demand. This we do not admit. We do not undertake nor advocate anything which is unreasonable, unnatural or unfair. Those who oppose the maintenance of fair prices when the volume of business is low on the ground that it is contrary to the law of supply and demand, make the mistake of supposing that capacity to produce creates supply. The law of supply and demand means the quantity which one possesses and is willing to dispose of and the quantity which another desires to possess and is willing to buy. Capacity to furnish does not create supply; nor does ability to purchase create demand. It is

just as illogical to say that because one is able to furnish a given quantity, that is evidence of the supply, as it would be to say that because another can use and has the money to pay for, a certain quantity, that constitutes a demand. The whole question should depend upon mutual consideration and decision. The seller should never take advantage of the necessities of the consumer to unreasonably advance prices, nor should advantage be taken of the necessities of the producer to secure his product at an unreasonably low price.

"What then should the manufacturer do at times when the consumers or purchasers are not willing to pay the price demanded, however reasonable it may be? Many of us at least believe he should reduce the output to meet the demand, much or little, and wait until those in need are willing to pay what is fair and right. Remember this assertion is based on the assumption that prices at all times must be fair and reasonable, and subject to reductions or changes whenever it is decided they ought to be made. Such reductions, however, should be made only after due consideration, and in an ordinary way and not as the result of panic.

"On the other hand, if prices are at any time higher than they ought to be, the consumer, whatever his pecuniary ability to pay may be, should wait until the prices are reduced. If the attitude of both seller and purchaser should be as suggested, it would not be long before they would get together on a proper basis, especially if what we advocate shall be carried into actual effect. What has been said is outside of, and without reference to, any question of special privilege, or undue advantage, or improper control of any commodity which would enable the producer from motives of cupidity or otherwise to fix or maineain unreasonable prices, or to take advantage of the necessities of the consumer. The great aggregations of wealth make this question important; but it may not be appropriate to discuss the same at this time.

Real Co-operation.

"Now, shall we bring about the conditions which have been suggested as ideal?

"The existence of this Institute, and the large attendance on this occasion, furnish the answer.

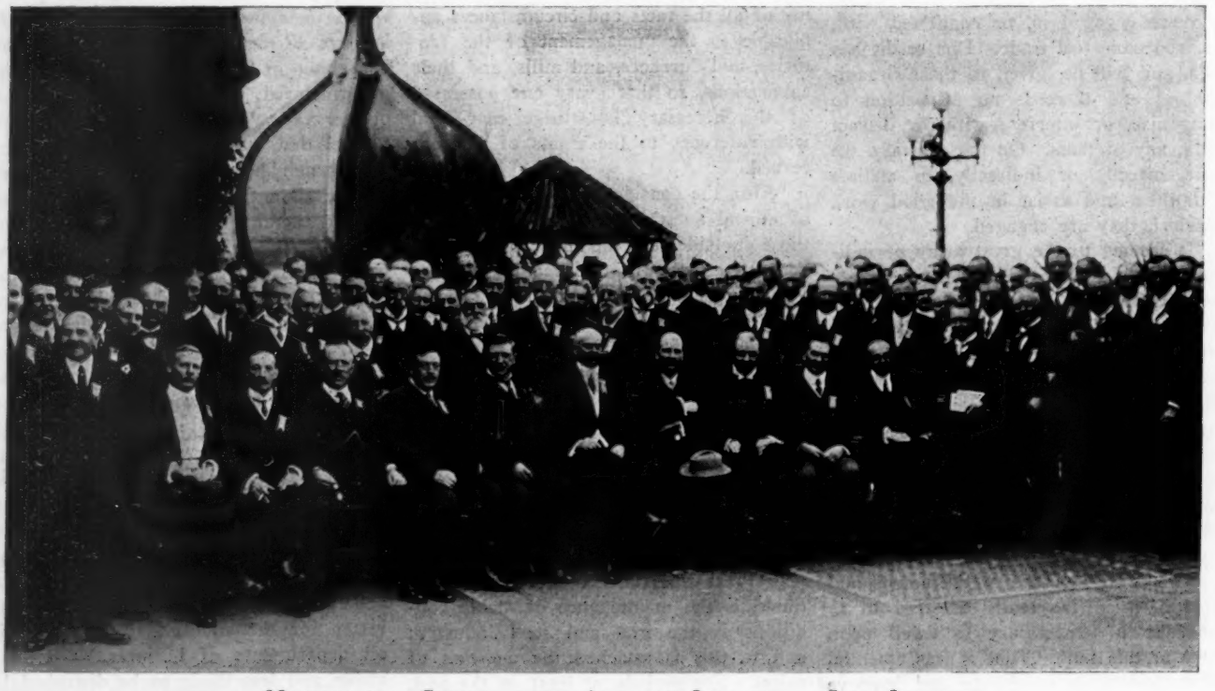
"Real, hearty, cheerful and continued co-operation on the part of the members will secure results which should be entirely satisfactory. Frank and friendly intercourse; full disclosure of his business by each to the other; recognition by all of the rights of each; a disposition to assist and benefit each other so far as practicable and proper; conduct founded on the belief that healthy competition is wiser and better than destructive competition; all these are desirable and necessary and will be effective.

Agreement Not Necessary.

"Some of you may say that, in your opinions, based on the past, a fair and just equilibrium cannot be maintained except as the result of some agreement on the part of those who are interested. It is a sufficient answer to make that you have no right to enter into such an agreement, expressed or implied; that the laws of this country are opposed to it. But, as stated by the attorney general of the United States in his argument before the Supreme court in the Standard Oil case, the law does not compel competition; it only prohibits an agreement not to compete. If competitors are in frequent communication and make full disclosure to each other in regard to their business, notifying one another of what they are doing, it will follow as a natural result that no one will take advantage of the information he thus receives to act unjustly or dishonorably towards his neighbor. You know by experience this is so; and it will become more certain as time goes by and each of us realizes more fully his obligations to others and to this Institute.

"Co-operation is broadening in its application to specific subjects growing out of the activities of life. We see it in many lines of business outside of our own. We see it in this country, and in foreign countries. Especially have we observed it during the last few months in the consideration of some of the matters which have demanded the attention of the Interstate Commerce commission and other official departments.

"Co-operation can be, and should be, extended to our business relations with foreign manufacturers and producers. They will meet us half way. Indeed, the presence at this meeting of so many distinguished and representative men from



MEMBERS AND GUESTS OF THE AMERICAN IRON AND STEEL INSTITUTE.

Great Britain, Germany, Austria, France and Belgium, respectively, is positive proof that they believe in this Institute, and are friendly to its members, and have high appreciation of the efforts we have been making in the direction of conciliation and co-operation. Whenever and however we may have opportunity to meet these gentlemen and to legitimately co-operate with them in promoting and conserving their interests as well as our own, we should do so without hesitation. We must at all times evidence a disposition to reciprocate the friendship which these gentlemen have shown, and to demonstrate to their satisfaction that we believe thoroughly in the doctrine that we are far more or less bound together by business connections, and that we enjoy prosperity when they enjoy it, and that we fail of success when they fail. Many who are present will live to see the time when the spirit of co-operation shall extend even to the government of the nations of the earth.

MEMBERS AND GUESTS OF THE IRON AND STEEL INSTITUTE, WHO ATTENDED RECENT ANNUAL MEETING OF THIS SOCIETY, AT BUXTON, ENG.

The Proper Course.

"Again, there is no better way of advancing our own interests than to conduct ourselves in such a way as to make it certain we are endeavoring to promote the welfare of others with whom we come in contact. Uppermost in our minds should be the proper consideration of the rights of our employes. Members of this Institute represent corporations or firms which have in their employ hundreds of thousands of men. Many of these workmen are foreigners who are not familiar with our language or customs. Some of them have been poor and have had few advantages in their native countries, and may not be fully able to protect themselves. Whether this be true or not, we should make it certain that all are so treated that they have the opportunity to be well housed, and well fed, and well clothed. So far as we can, we should lend our assistance to the improvement of the conditions of our workmen, and, of course, the wages paid should always be fair and reasonable. All of us have discovered since this Institute was formed that there were many things which we could do for the betterment of the conditions of the workingman; and we have been prompt to do them. Particularly have we made great strides towards safeguarding our employes against accidental injury. A continuation of the efforts we have been making in this direction will result in securing a larger measure of confidence on their part, and will bring to us the consciousness that not only have we benefited ourselves pecuniarly, but what is more important, that we have done the right thing. Certain aspects of this subject will be presented in a special paper.

"Also, we should extend the spirit of co-operation to our customers. We should be sure at all times that we are treating them right. If it is claimed on any occasion by a customer that our prices are too high with respect to any commodity, we should promptly take up with him the question for the purpose, and with the intention of arriving at a just conclusion. In all cases, we advocate the doctrine of co-operation as opposed to independent action. We have found, particularly during the last two or three years, that we are succeeding better as we are brought into closer relations with our customers, giving them our confidence and informing them frankly of our conditions and intentions.

"I predict for the Institute a great future. We are ambitious to have it prosper, and shall not be disappointed. So long as we pursue the path we have marked out, we shall merit and receive the approval of all who are acquainted with our work. The influence of the Institute for good will be pronounced, and as it is better established and thoroughly known, its opinions, as officially expressed on all matters which it may properly consider, will be respected.

"For the honor you have conferred upon me personally in the election of your first president, and for the cordial support which you have extended without reserve, I thank you sincerely. For your confidence and friendship, I am profoundly grateful."

Foreign Relations.

The paper on "Foreign Relations," by James A. Farrell, president of the United States Steel Products Co., was read by E. C. Felton, president of the Pennsylvania Steel Co. In the discussion of this paper, E. C. Felton, Geo. W. Perkins, of J. P. Morgan & Co., E. Schaltenbrand, chairman of the Stahl-

werks-Verband Aktiengesellschaft of Duesseldorf, Germany, and E. A. S. Clarke, president of the Lackawanna Steel Co., participated.

"Betterment of Labor Conditions in the Steel Industry" was treated in an advanced way in a paper read by W. B. Dickson, first vice president of the United States Steel Corporation. Following Mr. Dickson's paper, a recess was taken and luncheon was served in rooms adjoining the meeting auditorium.

Upon the reconvening of the Institute, Mr. Dickson's paper was discussed by Chas. Kirchhoff, Edgar S. Cook, president of the Warwick Iron & Steel Co., Pottstown, Pa., and Edward Bailey, president of the Central Iron & Steel Co., Harrisburg, Pa.

CHARLES KIRCHHOFF.

Dusseldorf Congress.

Chas. Kirchhoff, who was present at the International Metallurgical Congress of 1910, at Dusseldorf, Germany, presented the following report, dealing with the interesting features of this meeting:

The Fifth International Congress of Mining, Metallurgy, Applied Mechanics and Practical Geology was held this year in June, at Dusseldorf, Germany. As compared with the first gathering at Paris, in 1878, the attendance of delegates, the high character, variety and scope of the papers, illustrated well the wonderful progress made since then. Now there is an army of trained, scientific observers in close touch with practice where once they might have been counted on the fingers of both hands. An international exchange of experience has developed which is lifting the iron and steel industry to a much higher plane, expressed in better and more uniform quality of products, in enlarged and broadened range of uses, in a more complete utilization of raw materials, in the suppression of waste, in much improved working conditions of labor, and in more intelligent and therefore more satisfactory co-operation between buyer and seller. There is a much quicker recognition of the merits of improvements, which is best illustrated by the extraordinary rapidity with which the gas engine and the electrical drive have become well nigh universal.

Technical Progress.

Having invited the Congress to come to Germany, the hosts arranged for a splendidly complete series of papers detailing in nearly all the departments the technical progress made during the past decade in their own country. Naturally it reflects the peculiar conditions, some of which are characteristic of Germany as a whole, like the relatively low wages and the abundance and the high professional standard of the technical administrative and commercial staff. Other conditions differ in different parts of that country, like the cost of raw materials, the cost of assembling and marketing, so that emphasis is placed upon certain considerations in one section which are relegated to a more secondary position in others.

Fuel Economy.

Fuel economy in all the districts and in some sections like Upper Silesia and in the Saar district, the necessity to manufacture a moderately fair blast furnace coke from rather unpromising coal, have been among the chief problems of the German iron industry. The persistence and skill with which they have been solved are among the proudest achievements of German managers and engineers. For decades the indifference of American ironmasters to the value of economics along the same line was the marvel of unprejudiced observers, even after making due allowance for potent mitigating circumstances.

American and European Problems.

For a long time, those who had wrestled with the problems of one country could not understand the seeming indifference to them of the producers in another. Twenty years ago, our European friends came over, wondered at our labor-saving appliances and our craze for tonnage, went home and figured that with their cheap labor the costly appliances would not justify increased interest, sinking funds, and repairs, and that order books into which tonnage dribbled by hundreds of tons would not permit of installing plant which fed on blocks of thousands.

A Connellsville coke maker, whose coal was costing him 50 to 60 cents a ton, could see little inducement in building by-product ovens and costly recovery plant with uncertainties as to marketing by-products when his principal object

was to double output at short notice in boom times and gather in additional coal acreage in times of depression.

Recent Tendencies.

But the tendency has been, in recent years, to so modify basic conditions on both sides of the Atlantic that the point of view of captains of industry has steadily approached. Wages have been rising in Germany, and the burdens of social legislation are adding to them more and more. Home consumption and foreign outlets have expanded so that the unit of output has grown larger, and "American" mills of relatively enormous capacity and cost no longer have any terrors.

We are rapidly adopting European methods of coking; we are looking after steam economy, even in Pittsburg; we are well started in the introduction of the modern gas engine, and are in the front rank in applying the electric drive.

It almost looks, too, as though a condition which has long favored industrial undertakings abroad from our point of view may have some influence with us.

In those countries in Europe in which 30 years ago the State acquired the railroads, capital accumulating has had no outlet in perfecting and extending the railroads, and has been driven into industrial investment.

Attitude Toward Railroads.

While there is no public demand for State ownership of the railroads in this country, it does look as though a larger proportion than hitherto of our annual savings will seek employment in other directions, unless a more reasonable attitude toward the common carriers is made to prevail.

However, to me one striking fact, while watching technical and economic developments in the steel industry of the principal industrial countries, has been that methods and plant are becoming almost internationally uniform. The provincialisms, if I may so term them, due to exclusive attention to local conditions are disappearing, and he who could once return from a trip to a foreign country with swelling pride concerning great achievements at home and a somewhat languid interest in what was being accomplished elsewhere, must be content now with a relatively small and narrow budget of glorification and a pretty small array of items to justify posing as a reformer.

Basic Bessemer Process.

Let me state at the outstart that the Dusseldorf Congress did not bring out any new developments sensational in their character, no new departure which might give promise of those revolutions in the steel industry of which we hear every day, but which really occur at such very rare intervals. No better illustration of how much patient and persistent effort and how much time is required to perfect a really revolutionary invention could be furnished than the splendid record of the basic Bessemer process in Germany. W. Esser's paper before the Congress is a brilliant presentation of the modern methods and should be studied by those who desire to appreciate wherein lies the strength of Germany's steel industry. I shall not follow him into details because the basic Bessemer process has never found a footing in our own country, owing to the fact that our raw materials call for other methods.

During the past few decades, the Germans have been the leaders in studying fuel economy and beginning with the first stage, the manufacture of coke, they have continued to make steady progress.

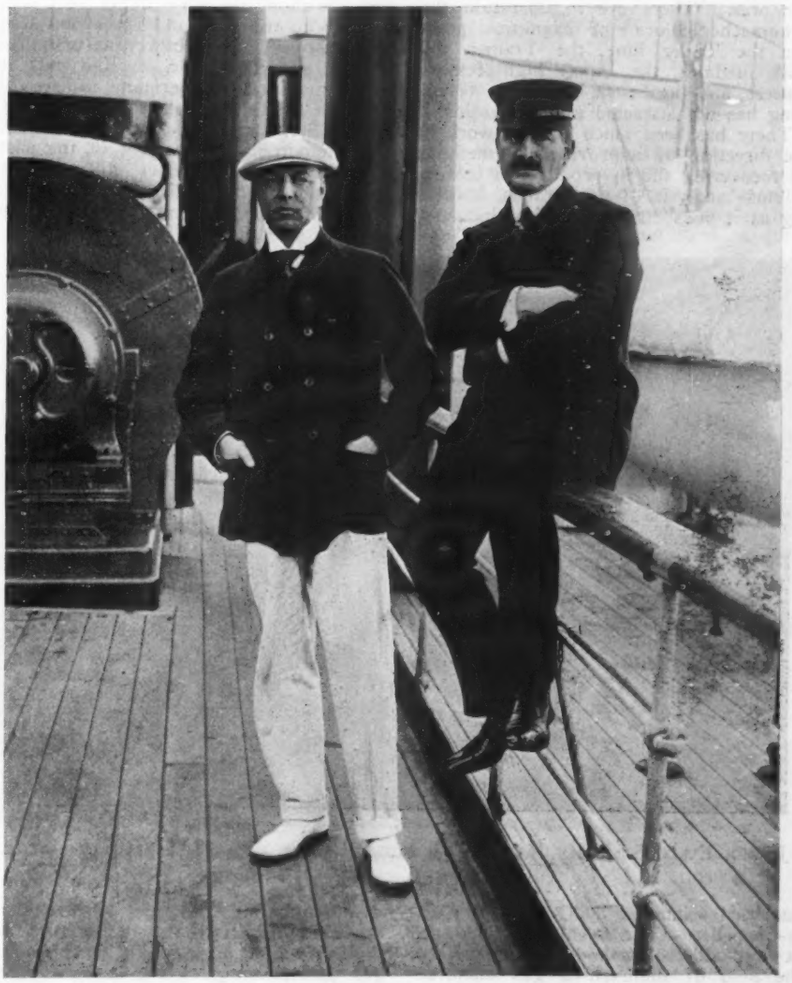
Utilization of Coke Oven Gas.

A very elaborate paper before the Congress was that of Professor Fr. Herbst, of Aix-la-Chapelle, on "Modern Ovens and the Development of the Mechanical Appliances." Coke oven gas is being utilized more and more, on the Continent, to drive gas engines and is being employed also for heating open-hearth furnaces. There has been a good deal of activity in utilizing coke oven gas for lighting, heating and power for communities and a very comprehensive scheme is being seriously considered to distribute power from a central plant to a unmber of Rheinish cities. The lead which we took in this country of making gas the principal product with coke as an incidental, is being followed in Europe. With the many varied purposes, adaptation to them has been reflected in the design and operation of coke ovens.

The higher value of the surplus gas has given increased vogue to the oven types with regeneration, and one of the principal aims of coke oven builders has been to overcome the irregularity of heating in the regenerative ovens incident to the reversing. This is sought by a maximum division of the flues and more careful combustion, or by the plan of obviating the reversing altogether.

Herbst reviewed in detail the betterments made in the Otto regenerative oven, in the Koppers and in the Collin. He referred to recent experience with the Kros oven, which is being built by Salan & Birkholz, of Essen. It has given encouraging results so far as mitigating the influence of reversing is concerned and has brought about a decrease in the time of coking from 44 to 28 hours. He reported on the new Coppee oven, on that of the Rheinische Chamotten und Dinas Werke and on the Ries inclined oven of the Stettiner Chamotte Fabrik.

Professor Herbst devoted a good deal of attention to recent improvements in stamping machines, noting among others the Meguin machine with electro-mag-



BARON VON BODENHAUSEN, MEMBER OF THE BOARD OF FRIED. KRUPP, ESSEN, AND G. SCHALTENBRAND, PRESIDENT OF THE BOARD OF THE GERMAN STEEL WORKS' UNION, DUSSELDORF, GERMANY.

netic lifting device. He dealt, also, with charging and leveling machinery, with devices for getting rid of the gas during charging, with improved oven doors and discharging and quenching appliances.

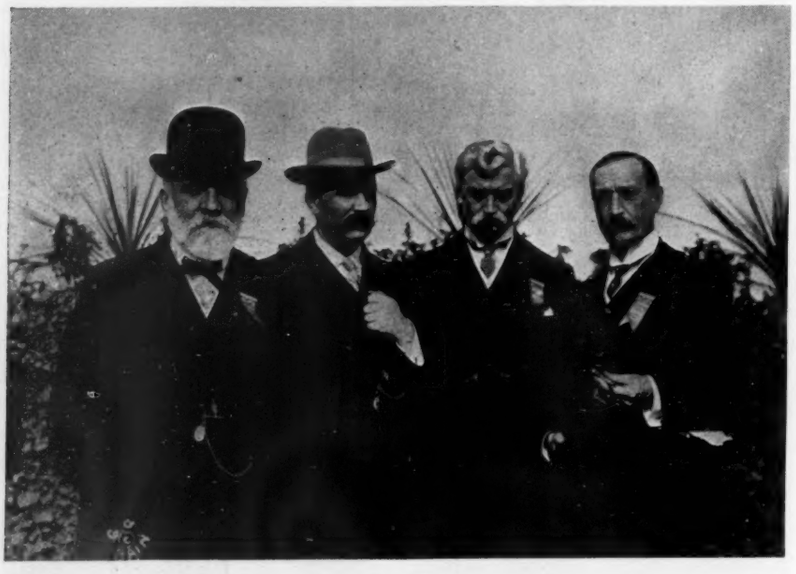
Briquetting Flue Dust.

In the preparation of iron ore for the blast furnace, relatively little has been done thus far in Germany. Attention has been directed more particularly to briquetting flue dust. Professor G. Franke, of Berlin, in a paper on the subject, estimated that 10 plants with a capacity of 700,000 tons per year handle over 500,000 tons of flue dust, leaving only a relatively small balance for ores. There are in operation the Schumacher chloride of magnesium process, the Tigler lime, the Trainer cell pitch methods, the Ronay high-pressure process, and the Scoria process. Nodulizing has not attracted much attention.

There has been much earnest work in the direction of improving the methods of recovering the by-products in coking. A close analysis of this branch, bordering as it does on the chemical industry, has been submitted by O. Rau, of Aix-la-Chapelle. Coke oven engineers, who at first adopted methods borrowed from the field of illuminating gas manufacture, have worked along lines aiming at a more direct adaptation to the conditions affecting the coking industry. The removal of the tar is based upon the fact that above 80 degrees Celsius, tar is in the gas in the form of a fog, which needs only to be forced into the form of sufficiently large and heavy drops. This is effected either by the centrifugal method, adopted by Brunck, or by a tar jet, used by Otto. It is a necessary preliminary for the direct sulphate process of recovering the ammonia in the coke oven gas, introduced into practice on a large scale both by Otto and by Koppers, with highly satisfactory results as to increased yield and lowered costs.

Burkheiser separates the ammonia by sulphurous acid, utilizing the sulphuretted hydrogen in the oven gas and obtains a mixture of sulphate and sulphite of ammonia, which has made good records as a fertilizer. The question of marketing of the tar, benzole and ammonia is receiving eager attention, and there has been some uneasiness over the rapid expansion of the industry producing fixed nitrogen in various forms. Of the total production of coal in Germany during 1909, 76 per cent was fired direct, 4 per cent was coked without by-product recovery, 16 per cent was coked with by-product recovery and 4 per cent was used for the manufacture of illuminating gas with by-product recovery. In the United States, 87 per cent was fired direct, 10 per cent was coked without recovery, 2 per cent was coked with recovery, and 1 per cent was manufactured into lighting gas with by-product recovery. Or, as Rau puts it rather significantly, Germany utilizes 20 per cent of its coal rationally, while the United States so handles only 3 per cent.

An important achievement of the past ten years has been better utilization of the waste gas from blast furnaces, the principal phase of which has been the development of power. It was recognized soon after the introduction of the gas engine driven with blast furnace gas that cleaning of the gas was very important. Curt Grosse, of Metz, collected for the Congress the latest information on the subject. How rapidly the appreciation of its value has spread may be realized from his estimate that now over 63 per cent of all the gas coming from German blast furnaces is cleaned. Improvements in detail have been made in the coolers and automatic removal of the slimers has been worked out, but the main reliance is upon the mechanically-operated apparatus of the Zschocke, Theisen, Bian and Schwarz types, the general plan followed being to remove the dust in two successive stages, the first to obtain gas suitable for the heating of stoves and for combustion under boilers, while the second aims at as thorough a cleaning as is possible for the gas for engine purposes. The tendency is to concentrate the whole apparatus, with the exception of the dust catchers, in one central plant, where there are a number of blast furnaces.



JOSEPH ELLIS, SIR JOHN RANDLES, G. MUIR RITCHIE AND COL. SIR CHAS. ALLEN.

Saving of Fuel.

Herr Grosse has collected data which show that the saving in coke through a gas cleaning plant varies from 20 to 55 kilograms per ton of pig iron and that the temperature of the blast was increased from 60 to 100 degress Celsius. The time required to heat the stoves was cut down nearly one-half, while the time during which the stoves could be kept on blast increased by 30 minutes. When running on cleaned gas, the stoves use about 42 to 44 per cent of the furnace gas. Adding 16 to 18 per cent for the other requirements of the furnace, there would be available about 37 to 42 per cent for steel works and rolling mills and for any other outside uses. The life of the hot blast stoves is longer, but it must be taken into consideration that since the cooled and cleaned gas has a considerably higher calorific power and needs a longer path, the stoves must be considerably higher. Recently, stoves up to 40 meters (125 feet) in height have been built.

Progress in Open-Hearth Practice.

The open-hearth process has been making rapid progress in Europe, notably so in Germany, and several papers were brought forward before the Congress, the most comprehensive being that of R. Genzmer, of Julienhuette, Upper Silesia. He dealt more particularly with the pig and ore process, which has made headway so rapidly since the use of direct metal, and is conquering a place in Germany in competition with the basic Bessemer, on irons carrying a relatively high percentage of phosphorus. The mixer is playing a more and more important part, there being a growing tendency to utilize it for preliminary refining, particularly when the mixer is well heated. Additions of ore and of lime are employed to practically get rid of the silicon, while sulphur is reduced by about one-half.

Pig and Ore Process.

At the Georgs-Marienhuette, at Osnabrueck, a 150-ton mixer, heated with blast furnace gas, is used; a second 250-ton mixer being under construction, which together will then serve three 50-ton open-hearth furnaces, there being five in all. About 5 to 6 per cent of ore and 3 to 4 per cent of lime are added, the iron carrying 3.80 per cent carbon, 2.75 per cent manganese, 0.4 per cent phosphorus, 0.6 to 1 per cent silicon, 0.05 per cent sulphur and 0.4 per cent copper. The iron delivered by the mixer contains 3.50 per cent carbon, 1.2 per cent manganese, 0.08 per cent silicon, 0.15 per cent phosphorus and 0.02 per cent sulphur. Using 70 per cent pig and 30 per cent scrap, the addition of ore in the open-hearth is 16 to 17 per cent, of whose iron contents 83 per cent is recovered. It is expected that when the second mixer is in operation, it will be possible to produce with these open-hearth furnaces about 800 to 850 tons of steel per day. Labor has been decreased, the consumption of lime, dolomite and ore have been lessened, and

the yield in good ingots has been 103 to 104 per cent. The consumption of coal for the open-hearth furnaces using the Kerpely producer has been 16.3 per cent.

Hoesch Process.

An interesting recent development has been the introduction of the Hoesch process, a modification of the Bertrand-Thiel process, which has been elaborately reported on recently by Dr. Springorum. It is in operation at Hoesch and at Hoerde and is being installed at Friedenshuette and at Koenigshuette in Upper Silesia. The process is the outgrowth of work done under the Bertrand-Thiel method at Hoerde, where it was found, however, that in consequence of the low temperature and the heavy lime additions in the primary furnace there were large accretions, while the high temperatures in the finishing furnace caused the latter to suffer rapidly. It was decided, therefore, to work in one furnace, the method being the following: After the furnace has been charged with lime and ore, the liquid metal is added and the reaction starts at once. After it has ceased to boil and is sufficiently hot, the charge is tapped with a ladle and the slag is easily poured off. After again charging the furnace with lime, ore and scrap, the metal is again poured into the furnace. The finishing takes only a short time because the fresh slag acts rapidly and the charge is quickly brought up to the highest temperature.

At Hoerde the iron is taken from the same mixer which supplies the basic Bessemer plant, and contains about 1.85 per cent phosphorus, 1 to 1.50 per cent manganese, 0.25 to 0.60 per cent silicon and 0.1 to 0.15 per cent sulphur. In the first heat the phosphorus is brought down to 0.1 to 0.3 per cent, and what is extremely important, the slag which is produced carries from 20 to 26 per cent phosphoric acid, of which 80 to 90 per cent is soluble as citrate, so that it is readily marketable for fertilizing purposes. The yield of phosphoric slag is 12.6 per cent of the weight of the ingots. During the fiscal year 1908-1909, there were charged 48,463 tons of material, exclusive of ore, consisting of 74.72 per cent pig iron, 0.25 per cent spiegeleisen, 0.84 per cent ferro-manganese, 0.02 per cent ferro-silicon, 0.17 per cent scrap iron and 24 per cent steel scrap. The yield was 50,606 tons of ingots or 104.42 per cent. There was also charged 11,011 tons of ores and mill cinder, the yield being 93 per cent of its iron contents. The average analysis of the steel was 0.07 per cent carbon, 0.02 per cent phosphorus, 0.44 per cent manganese, and 0.055 per cent sulphur. The cost is equal to that of a basic Bessemer plant with basic pig at 53 marks a ton, on the basis of 30-ton open-hearth furnaces. With larger furnaces it would probably be lower. With higher prices of basic pig, the Hoesch process would gain relatively.

Herr Schaltenbrand, who is now serving as president of the Dusseldorf Congress, and Professor H. M. Howe, discussed the report.

Contract Obligations.

The final paper of the Institute on "Contract Obligations" was presented by Willis L. King, vice president of the Jones & Laughlin Steel Co. A very general discussion of Mr. King's paper was given by representative American iron and steel manufacturers, whose connection with the sales organization of their respective companies qualified them to speak in a broad way upon this subject. In this discussion, remarks were made by C. M. Schwab, John A. Topping, president of the Republic Iron & Steel Co., Chas. S. Price, president of the Cambria Steel Co., H. P. Bope, first vice president of the Carnegie Steel Co., and E. J. Buffington, president of the Illinois Steel Co. After some concluding remarks by President Gary, the first formal session of the American Iron and Steel Institute was declared adjourned.

A Notable Banquet.

Probably never before has a more notable body of men of large affairs of the United States and foreign countries gathered as one assemblage, than was present at the annual banquet of the Institute, given in the grand ball room of the Waldorf-Astoria, Friday evening. From the standpoint of American iron and steel and affiliated industries, the occasion has probably never been surpassed in this country, either in the scale of importance and influence of the separate manufacturing institutions, over which those present exercise a guiding hand, or in the elegance of appointment of this affair. The toast list was most impressive, including some of the most prominent of the foreign guests, all of whom, in behalf of their respective nations, delivered a message of cordial feeling for their American hosts and of hearty endorsement of the principles of enlightened co-operation which had characterized the formal sessions of the Institute.

Judge Gary, as president of the American Iron and Steel Institute, acted as toastmaster. He first introduced G. G. Thorp, vice president of the Indiana Steel Co., who by the aid of stereopticon views and moving pictures, presented a complete exposition of steel manufacturing operations, from the ore to the finished product, at the Gary works. Mr. Thorp gave an interesting talk on the processes pursued.

Responses.

Graciously turning to the evening's program of toasts and responses, Judge Gary spoke, in part, as follows:

This is a momentous occasion. There is represented in this room the principal iron and steel manufacturers of America and also a very large percentage of the manufacturers of iron and steel of foreign countries. In this day and age when competition is so great the world over, when men are in contests for pecuniary success, when rivalry is not only emphatic but often destructive, and many times bitter, we in this room advocate the gospel of peace and good will. Our creed is the golden rule and we practice what we preach. Many kind things have been said during the day concerning the United States Steel Corporation, and that corporation and its representatives have been generously given much credit; but I assure our friends from abroad that the great success of the United States Steel Corporation is largely dependent on and the result of the friendship and co-operation of other great steel and iron manufacturers in this country. Whenever any question of great importance is to be considered, all the leading iron and steel men of this country cheerfully and promptly meet for consultation and lend their influence

ENGLISH GUESTS OF THE AMERICAN IRON AND STEEL INSTITUTE.

and effort to the success of whatever object may be sought to be determined.

Response of Charles M. Schwab.

The task which our chairman has assigned me this evening it not a task but a pleasure, because as a pleasure, and upon this occasion and upon this subject, it is possible for me to extend our friends from across the water a hearty welcome. It is like the welcome of a mother to her child. All the great processes of iron and steel have been evolved by our friends across the water, but we, the sturdy child, have made them the great possibilities that we find them depicted in these moving pictures, this evening. There was a time when the doors of mills throughout Europe and America were closed to all. Happily, today, they are open to all. And let me say to you, my friends, that if the doors of our American mills are not open wide enough, why, we will tear down the fences and let you in.

Response of Sir John Randles.

When I was a boy, in Britain we thought that we were capable of running the globe so far as manufacturers were concerned, and we had some vague sort of ideas to the effect that you people in this country would be hewers of wood and growers of corn and cotton. But that is not so today. We listened to the figures which Judge Gary recounted this morning with admiration at the magnificent genius of a race, which in so few years, has produced such wonderful results in the greatest industry of the world—that of iron and steel. There is a great change in our relative positions of nations. Formerly, the one idea was for a man to go into our industry with a view to acquire individual wealth and to seek for himself its possession. A revolution in that respect is coming, if indeed it has not already arrived. I do not know how you each regard yourselves, but speaking for myself—and I am connected with an amalgamation of concerns, though they are small as compared with some of your great corporations—I regard myself as a trustee for the workers whether in the mine, the furnace, the mill or the railway, whatever their position may be; a trustee for every man who works in the industry, and for every woman—perhaps the widow of a workman, and every child—and for every person who has put his or her savings into the industry with which I am connected. I feel, we feel, that we are trustees for these people and that we are not there solely to make our individual pile. It is always of value to remember that there is a commercial side which has to do with the market, which must take account of geography, which must take account of financial and even political considerations. All of these things will be attended to and thought of, I take it, by those who represent you in your great industry and by those of us across the sea who see in this new era, possibility of friendly co-operation which $3, $10 or $17 steel cannot accomplish. We talk about this time of $17 rails, and you may do so if you like, but what does it mean? It means this: that when that policy of $17 rails was inaugurated, it meant more misery than was caused by the bloodiest battle in war. It meant ruin in thousands of homes. It meant an industrial army laid aside and the workers deprived of their sustenance. It meant less of industry that ought to have been maintained. It meant disaster worse than war. It was war in commerce and the regime could not prevail. In the old country we esteem your genius, we admire the splendors and glories of your country, we feel that we are part of your concern, we believe that you cannot if you would make blood thinner than water; it is thicker than water. We are connected by all manner of ties. We are perhaps old as things go, but we are prepared to take our part in the new venture.

Response of Baron Von Bodenhausen.

I think that there can be said some things about competition which are not quite as bad as they may seem. One thing is quite certain, which is in favor of competition, and that is that we would not be here, around these festive tables, without having had competition. Competition is simply a law of nature. So it was from the beginning, so it always will be. From that point of view I think that your legislation is the outgrowth of that law of nature. I think that this law is a very healthy one, being based on the very principles of nature. But, it should have its limitations, and these limits have to be considered very carefully. Beyond those limits the law I was talking about is going to be a curse and the blessing I was talking about is going to be a curse. There again I think that nature can teach us where to draw the line. For example, take the growing forest trees. As they evolve most naturally, it must happen that some of the weaker ones, are turned down and must be overcome; but nature never will allow any one tree to overcome and outdo them all. And so this same law, applied to competition means that each of us ought to look very carefully as to where to draw that line, taking into consideration not only the evolution of its own individual strength, but also the strength of the community.

It is a well-known law of business that to know your customer personally means half of your success, but it is very much less known all over the world, that to know your competitor personally means the other half of your success. It is a great credit to Judge Gary and all his prominent friends that you have realized the truth of this statement, that you have to raise your mutual competition to a level at which it ought always to stand and which, in one word, I would call a gentleman's level. In doing this you have served your own business; you have served your whole country, and you have been working to the benefit of the world's trade, and this, gentlemen, is the point of view in which I am most deeply interested in today's meeting. I am quite sure that bringing us together into closer touch will have the advantage of learning to know, to esteem, and as I hope, to like each other; this mere fact, with due respect to that law of competition, must necessarily serve to keep our competition sound, to keep it on the level which I have been speaking about and to keep it within the reasonable and the natural limits.

Response of G. Scoby-Smith.

I understand your institute concerns itself more immediately with commercial questions. Our past intercourse with you has, I think, proved to us all that it is our mutual advantage to meet and discuss these problems which are of equal or greater importance than technical experience. By doing this we not only enable the producer to have the advantage of the experience of the best appointed works, but we are able to exchange much information as to supply and demand, as to prevent over-production or undesirable scarcity, and hence, possibly inflated prices. So far as the gentlemen present from England are able to represent the English views, I believe we are in accord with the idea that arrangements of this character are to the advantage of all. We have come here to learn and be instructed, and I trust that the result of our visit may be to draw us into closer relationship with you. European makers are generally prepared to take a reasonable view on all questions affecting their commercial interests, and, on the other hand, I may say that we have always found the American equally reasonable. We hope that the bond of union inaugurated by the birth of your American Iron and Steel Institute will continue to exist and to extend. Possibly in the near future, these gatherings may prove the need of an international iron and steel institute, at which the discussion of commercial and technical questions may be a feature. I am sure that a policy of exchange of views and experience on such matters, and the friendly conference which they require, can do much to remove the sharpness of undue competition.

Response of L. Spaak.

We wish you, Mr. Chairman, to consider our coming here as a personal mark of respect to yourself. The new policy of reciprocal confidence that you have inaugurated in business has been profitable not only to the iron and steel industry of all the countries of the world, but, sir, the good ethics of your intervention have proved satisfactory in every direction. There is practically no situation in the steel industry, as in any other diplomatic relations, which cannot be solved by the application of this policy; and in times to come your example will be followed by all business men conscious of their duty, and competitors will not again consider each other as enemies.

Response of William B. Peat.

I am not a steel manufacturer, nor indeed a manufacturer of any merchantable commodity, hence, I can look upon your industries with the eye of a critic and congratulate you on having an American Iron and Steel Institute where all men, for the time being, may lay down their arms; may forget that some have to make and some have to lose, and some

make bad bargains and some make good bargains; that some sail to fortune on a rising tide, and others fail to do so; and remember that unbridled rivalry in commerce, unaccompanied by the courtesy of frequent conferences, yields, as its fruit, bitterness between nations, and unreasoning jealousy between individuals. We are here as comrades for the good of common industry and to foster friendship begun under such excellent auspices. The day is past when a policy of cut-throat competition is the best either for a country or for individuals. The day has arrived when good feeling between those engaged in competitive commerce will smooth over difficulties, which may otherwise prove to be insurmountable. The qualities which have made America great and famous are qualities which persist and remain with you, and which will make the future as distinguished as the present. Those for whom I have the honor to reply—guests in high positions in commerce, finance, banking and science, find they are able to meet you with the arms of good fellowship, and they congratulate you on the progress and wealth of your great industry, and thank you for your hospitality.

Responses were also made by E. Schaltenhand and R. de Labriolle.

Tour of the Harbor.

Saturday, Oct. 15, was spent by the members of the Institute and their guests in a tour of New York Harbor. Leaving freight pier 83, near the foot of West Forty-second street, of the New York Central & Hudson River Railroad Co., the steamer Commodore, with the members of the Institute and guests aboard, proceeded down the river to Ellis Island, where a landing was made for the inspection of the United States immigration station. Leaving Ellis Island the course was down New York Bay to Staten Island and into the Kill van Kull to Newark Bay; then returning by the same passage, the boat proceeded to the Narrows, and thence along the Long Island shore of New York Bay to the Bush Terminal, where a landing was made for the inspection of the Terminal. Leaving the Bush dock, the course was along the Brooklyn water front to the United States Navy Yard and thence up the East river through Hell Gate into Long Island Sound. Turning back the course was through the Harlem river to the Hudson river at Spuyten Duyvil and thence down the Hudson river to the starting point.

FOREIGN IRON AND STEELMAKERS, AND THE WORKS THEY REPRESENT

One of the most prominent English steel masters present at the Institute was Sir John S. Randles, member of Parliament and chairman of the Workington Iron & Steel Co., Ltd., which is the recent consolidation of the Moss Bay Hematite Iron & Steel Co., Ltd., of Workington, and other works in the Cumberland district. This company has works at Moss Bay, Workington and Cumberland and has a score of blast furnaces with numerous finishing mills, including a large rail capacity. Previous to this amalgamation, the name of Sir John Randles had long occupied a high and prominent place in the English steel industry by reason of his long connection as chairman of the Moss Bay Hematite Iron & Steel Co. He has been a forceful factor in the steel works and mining industries of the Cumberland district and it was a fitting recognition of his service for that community when, in 1900, he was elected a member of the House of Commons to represent that district. He was elevated to knighthood by King Edward five years ago. He has served as president of the British Iron Trade Association. Joseph Ellis, Esq., a director of the Workington Iron & Steel Co., Ltd., was also in attendance at the institute meeting.

Nephew of Sir Henry Bessemer in Attendance.

Col. Sir Charles Allen, director of the Ebbw Vale Steel, Iron & Coal Co., Ltd., of Ebbw Vale, Monmouth, Eng., is prominently identified with the English steel industry by reason of his relationship with the late Sir Henry Bessemer and by his long connection with the English steel trade, which has continued from an early age. Col. Sir Charles is a nephew of the great English iron master and has succeeded his illustrious forebear in the management of the works that have borne his name. He is now serving as chairman of Sir Henry Bessemer & Co., Ltd. For a number of years he has been a colonel in the Royal Artillery, having served in the Franco-Prussian war, and was also enlisted in his country's cause for the Boer war. He is a magistrate for the County of Derbyshire.

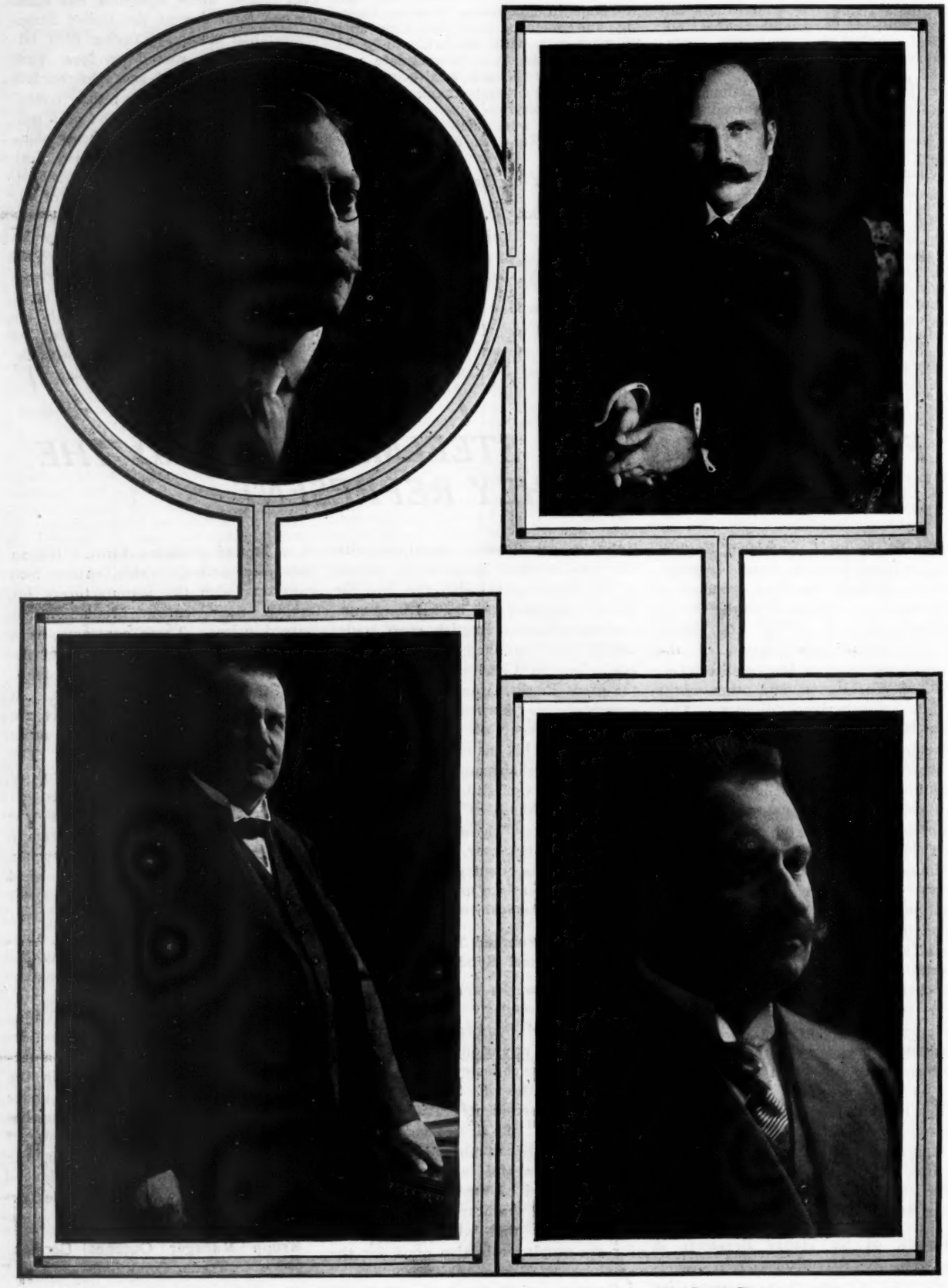
Herr Schaltenbrand Tells of German Steel Syndicate.

The Stahlwerks-Verband Aktiengesellschaft, popularly known as the German Steel Syndicate, came in for considerable attention from the American steel industry through the presence of Herr E. Schaltenbrand, of Dusseldorf, president of the board of management of this concern. As such, Herr Schaltenbrand is one of the most powerful factors of the industrial world of the German empire. The German syndicate is based upon the principle that whatever is good for the employer is also good for the employe.

Speaking of the operations of the syndicate, Herr Schaltenbrand stated that the organization is in the nature of a limited company formed for an indefinite period, which enters into contracts with the manufacturers for taking their entire production at agreed prices. These contracts, as a rule, are for five-year periods and the prices specified vary in accordance with the nature of the product. At the end of each year the profits are calculated and a distribution made among the respective works. The question of a monopoly control of the industry, which is exercised either directly or indirectly by the syndicate, is not so pertinent in Germany as in the United States, where such a concerted organization of the steel works would not be permissible under the terms of the Sherman anti-trust act. In Germany the different state railways, which are controlled by the government, are the largest consumers of iron and steel products, purchasing from 800,000 to 1,000,000 tons annually. Since the transportation facilities, which are so essentially a factor in the steel industry, are in the form of a monopoly themselves under government control and the government is the most vitally interested buyer in iron and steel prices, the syndicate of the steelmakers is looked upon as a perfectly equitable arrangement.

Krupp Manager Outlines German Trade Conditions.

Baron von Bodenhausen, director of the Fried. Krupp Aktiengesellschaft, Essen, Germany, spoke hopefully up-



CARL STEVEN.
FRANZ HARLINGHAUSEN.

SIR JOHN RANDLES.
GEORGE ZAPF.

on the state of the iron and steel trade in Germany at the present time in an interview given out in New York. Baron Bodenhausen said:

We are now running at 85 per cent of our total capacity in all our works. Last year the government railways did not order rails, but now they are coming back, and the demand is strong. All the industrials on our stock exchange are high, for dividends are very good. Then there is a good amount of work in our colonies in the way of building railroads.

Of course we do not erect skyscrapers in Germany. In the first place the building laws of the most of the towns are against it, and then in our cities we have much more space than you have in New York. But all big buildings that are put up nowadays there are of steel construction, and this makes the demand for structural steel increase from year to year. Still, "excellent" is too high a term to describe business, which I should charterize as very good.

No new field has been opened in Germany for the use of steel. Unfortunately aeroplanes and airships do not require much steel in their construction. The demand for steel for warships is going down because of our naval program, which defined the demand for steel from that source for years to come. But in the last year there has been an increased demand for iron and steel for merchant ships.

Baron Bodenhausen is a comparatively young man and is at the head of the commercial department of the Krupp works.

Carl Steven and G. Zapf.

Felton & Guilleaume Lahmeyerwerke Aktiengesellschaft at Muelheim on the Ruhr, Germany, was represented at the American Iron and Steel Institute by Carl Steven and G. Zapf, directors of the company. The Felton & Guilleaume works is among the largest in the production of iron, steel and copper wire, and cables in Germany. The present company is the combination of this plant with the Lahmeyerwerke, builder of electrical machinery, so that it is now engaged in the wire branch of the steel industry and also in the electrical equipment field.

The company has disposed of the electrical machinery works to the Allgemeine Electricitaets Gesellschaft, large German makers of electrical equipment, who will take possession about Jan. 1. Herr Steven, in discussing trade conditions in his line, stated that most of the German wire works were now operating to capacity, but that prices were at a level scarcely satisfactory to the manufacturer.

Herman Harjes, Esq., of Paris, France, who was one of the guests of honor of the American Iron and Steel Institute, is not directly associated with the steel industry of France but is of the banking house of Morgan, Harjes & Co., through which he has become identified with the financial side of steel manufacture in France.

G. Muir Ritchie.

G. Muir Ritchie, director of the Cargo-Fleet Iron Co., Ltd., Middlesbrough, Eng., is identified with one of the largest works of the Middlesbrough district. This company is a maker of bars, shapes, standard and light rails and a large manufacturer of open-hearth steel under the Talbot continuous furnace process.

P. N. Cunningham.

P. N. Cunningham, manager of Stewarts & Lloyds, Ltd., Glasgow, Scotland, appeared at the institute as the representative of the tube industry of Great Britain. The Stewarts & Lloyds, Ltd., operates large works at Glasgow, Scotland, for the manufacture of pipe, tubing and fittings. It is also a maker of iron and open-hearth steel, boiler and bridge plates, and operates a large steel foundry.

T. Scott Smith.

T. Scott Smith, one of the English steel men present, is general manager of Samuel Fox & Co., Ltd., operating the Stockbridge Works near Sheffield, Eng. This company is a maker of billets, rails, axles, spring steel, crucible steel, etc., from pig iron, as it operates no blast furnaces. It obtains its hematite from Middlesborough and Cumberland and its basic iron from Lincolnshire. The company also operates coke works and brick yards.

Franz Harlinghausen.

Herr Franz Harlinghausen is a director of the Phoenix Aktiengessellschaft and is directly interested in the wire manufacture of that company as manager of the works at Hamm, Westphalia, Germany.

Belgian Representatives.

Monsieur E. Tonneau represented the Societe Anonyme John Cockerill, of Seraing, Belgium, which is the largest steel works of Belgium. Its manufacturing operations are very extensive and besides producing a full range of rolled products from the ore, it is a builder of locomotives, ships, gas and steam engines and other power equipment. It has iron ore properties in Bilboa, Spain, and in Luxemberg, and also operates coal mines in Belgium. Monsieur Tonneau is a director of the company.

The Societe Anonyme d'Ougree-Marihaye, of Marihaye, Ougree, Belgium, the second largest steel works of Belgium, had two of its directors present at the institute meetings, Monsieurs L. Spaak and J. Van Hoegaerden. It operates coal and iron mines, blast furnaces and rolling mills, but does not build machinery.

French Representatives.

The French steel industry was represented by Monsieur R. de Labriolle, director of the Comptoir d'Exportation de Produits Metallurgiques, which is an export company dealing with the products of French steel works.

G. Scoby-Smith.

G. Scoby-Smith, Esq., managing director of Bolckow-Vaughan & Co., Ltd., of Middlesbrough, Eng., is one of the leading iron and steel masters of the United Kingdom. The works of the company are located in Middlesbrough and nearby that city and are among the most extensive of the country. The company has a large group of blast furnaces, two of which are of the American and the remainder of the English type. Bolckow-Vaughan & Co. find a market for some of their products in this country, as they are large makers of ferromanganese and sell a considerable portion of their output to the steel works and foundries of the United States, where they are represented by Rogers, Brown & Co.

The Foreign Guest Roll

Germany

Baron von Bodenhausen, director, Fried. Krupp Aktiengesellschaft, Essen, Germany.

Herr F. Harlinghausen, director, Phoenix A. G. fur Bergbau & Huettenbetrieb, Abteilung, Westfaelische Union, Hamm, Westfalen, Germany.

Herr Carl Steven, director, Felten & Guilleaume Lahmeyerwerke Aktiengesellschaft, Muelheim and Ruhr, Germany.

Herr Zapf, director, Felten & Guilleaume Lahmeyerwerke Aktiengesellschaft, Muelheim and Ruhr, Germany.

Herr E. Schaltenbrand, chairman, Stahlwerks-Verband Aktiengesellschaft, Dusseldorf, Germany.

Herr H. C. Kamp, Hamm, Westfalen, Germany.

United Kingdom

Sir John Randles, chairman, Washington Iron & Steel Co., Ltd., Moss Bay, Cumberland, and Workington, Eng.

G. Muir Ritchie, Esq., director, the Cargo-Fleet Iron Co., Ltd., Middlesbrough, Eng.

G. Scoby-Smith, Esq., managing director, Bolckow-Vaughn & Co., Ltd., Middlesbrough, Eng.

Col. Sir Charles Allen, director, Ebbw Vale Steel, Iron & Coal Co., Ebbw Vale, Monmouth, Eng.

William B. Peat, Esq., W. B. Peat & Co., 11, Ironmonger Lane, London, E. C., Eng.

David Colville, Esq., managing director, David Colville & Sons, Ltd., Motherwell, Scotland.

T. Frame Thomson, Esq., chairman, Otis Steel Co., Ltd., 62 London Wall, London, E. C., Eng.

Alfred M. Mosscrop, Esq., director, Dorman, Long & Co., Ltd., 36 E. Boulevard, Rochester, N. Y.

T. Scott Smith, Esq., general manager, Sam-

uel Fox & Co., Ltd., Stockbridge Works, near Sheffield, Eng.

P. N. Cunningham, Esq., manager, Stewarts & Lloyds, Ltd., Glasgow, Scotland.

John O'Connor, Esq., manager, John Brown & Co., Ltd., Sheffield, Eng.

Lincoln Chandler, Esq., secretary, Metropolitan Amalgamated Railway Carriage & Wagon Co., Ltd., Saltley, Birmingham, Eng.

Harry Steel, Jr., Esq., director, Steel, Peech & Tozer, Ltd., Rotherham, York, Eng.

F. Hill, Esq., managing director, Richard Hill & Co., Middlesbrough, Eng.

F. W. Manson, Esq., director, Richard Hill & Co., Middlesbrough, Eng.

Joseph Ellis, Esq., director, The Workington Iron & Steel Co., Ltd., Moss Bay, Workington, Cumberland, Eng.

M. Mannaberg, Esq., Frodingham Iron & Steel Co., Ltd., near Doncaster, Eng.

France

Herman Harjes, Esq., Morgan, Harjes & Co., Paris, France.

Monsieur R. de Labriolle, directeur, Comptoir d'Exportation de Produits Metallurgiques, S. A., 32 Boulevard Hausmann, Paris, France.

Austria

Herr Wilhelm Kestranek, manager, Prager Eisen-Industrie, Gesellschaft, 1 Landskrongasse, 1, Vienna, Austria.

Doctor Eugen Herz, secretary, Prager Eisen-Industrie, Gesellschaft, 1 Landskrongasse, 1, Vienna, Austria.

Dr. Hugo Von Noot, Assling-Hutte, Austria.

Belgium

Monsieur E. Tonneau, director, Societe Anonyme John Cockerill, Seraing, Belgium.

Monsieur L. Spaak, director, Societe Anonyme d'Ougree-Marihaye, Marihaye, Ougree, Belgium.

Monsieur J. Van Hoegaerden, director, Societe Anonyme d'Ougree-Marihaye, Marihaye Ougree, Belgium.

PURPOSE OF THE AMERICAN IRON AND STEEL INSTITUTE

The organization of the American Iron and Steel Institute, which was incorporated March 31, 1908, with the present officers and a number of the present directors as the directory, followed from the need long-felt, of a formal association through which the American steel manufacturers could meet upon some common basis for the mutual benefit of themselves, the general trade and the nation at large. The movement received an increasing impetus through the several dinners and meetings held in New York under the advocacy of a plan of co-operation and the concilliation espoused by Judge Elbert H. Gary during the trying times of the depression of 1908. The association has been quietly formulating its purposes in constructive form for the past two years, and the first formal meeting is expected to be followed by a comprehensive work in the compiling of statistics and in the treatment of other questions affecting the American iron and steel trade, which bid fair to exercise a great and broadening influence in the conduct of the affairs of this industry.

The officers, directors and members of the American Iron and Steel Institute follow:

President, Elbert H. Gary, chairman of the United States Steel Corporation.

First vice president, Powell Stackhouse, Cambria Steel Co.

Second vice president, Willis L. King, vice president of the Jones & Laughlin Steel Co.

Third vice president, Charles M. Schwab, president of the Bethlehem Steel Corporation.

Treasurer, Edward Bailey, president Central Iron & Steel Co.

Secretary, W. J. Filbert, comptroller United States Steel Corporation.

Assistant secretary, H. H. Cook.

Directors: Wm. E. Corey, president, United States Steel Corporation; E. C. Felton, president Pennsylvania Steel Co.; Elbert H. Gary; Charles M. Schwab; Powell Stackhouse; T. J. Drummond, president Lake Superior Corporation; W. J. Filbert; J. C. Maben, president Sloss-Sheffield Steel & Iron Co.; W. A. Rogers, Rogers, Brown & Co.; J. F. Welborn, president Colorado Fuel & Iron Co.; Edward Bailey; E. A. S. Clarke, president Lackawanna Steel Co.; Willis L. King; Samuel Mather, Pickands, Mather & Co., and John A. Topping, president Republic Iron & Steel Co.

List of Members

H. E. Andrews, director, Lackawanna Steel Co., New York.

Matthew Andrews, M. A. Hanna & Co., Cleveland.

M. Cochrane Armour, iron manufacturer, Chicago.

Frank Baackes, vice president and general sales agent, American Steel & Wire Co., Chicago.

Edward Bailey, president, Central Iron & Steel Co., Harrisburg, Pa.

Henry A. Barren, superintendent, Newburgh Steel Works, American Steel & Wire Co., Cleveland.

George Bartol, general manager, Otis Steel Co., Ltd., Cleveland.

John G. Battelle, president, Columbus Iron & Steel Co., Columbus.

Ephraim Bayard, superintendent, Donora Steel Works, American Steel & Wire Co., Donora, Pa.

Horace A. Beale, Jr., iron manufacturer, Parkesburg, Pa.

George H. Beaumont, Pickands, Mather & Co., Cleveland.

S. A. Benner, general sales manager, Carnegie Steel Co.

Robert Bentley, president, The Ohio Iron & Steel Co., Youngstown, O.

Frank Billings, Tod-Stambaugh Co., Cleveland.

Oliver A. Blackburn, vice president, Sharon Steel Hoop Co., Pittsburg.

W. W. Blackburn, second vice president and secretary, Carnegie Steel Co., Pittsburg.

Michael Blake, treasurer Susquehanna Iron Co., New York City.

Raynal C. Bolling, assistant general solicitor, United States Steel Corporation, New York City.

Charles H. Booth, vice president, United Engineering & Foundry Co., Youngstown, O.

H. P. Bope, first vice president, Carnegie Steel Co., Pittsburg.

Admiral F. T. Bowles, president, Fore River Shipbuilding Co., Quincy, Mass.

Charles T. Boynton, vice president and secretary, Pickands, Brown & Co., Chicago.

C. W. Bray, R. D. No. 1, Bridgeport, Pa.

T. J. Bray, vice president, Republic Iron & Steel Co., Pittsburg.

Henry N. Brinsmade, treasurer, Port Henry Iron Ore Co., New York City.

John Penn Brock, vice president, American Iron & Steel Co., Lebanon, Pa.

Robert Brooke, treasurer, E. & G. Brooke Iron Co., Birdsboro, Pa.

Fayette Brown, Jr., assistant secretary and assistant treasurer, Stewart Iron Co., Ltd., Cleveland.

Harvey H. Brown, H. H. Brown & Co., Cleveland.

William L. Brown, president, Pickands, Brown & Co., Chicago.

E. J. Buffington, president, Illinois Steel Co., Chicago.

James A. Burden, president, Burden Iron Co., Troy, N. Y.

Ellwood Burdsall, secretary and designing engineer, Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

D. Fairfax Bush, partner, Crocker Bros., 99 John street, New York.

J. G. Butler Jr., president, Bessemer Ore Association, Youngstown, O.

Clarence P. Byrnes, Pittsburg.

J. A. Campbell, president, Youngstown Sheet & Tube Co., Youngstown, O.

J. J. Campbell, auditor, Carnegie Steel Co., Pittsburg.

John W. Carpenter, general superintendent blast furnaces and steel works, American Steel & Wire Co., Pittsburg.

Clyde Mitchell Carr, vice president, Jos. T. Ryerson & Son, Chicago.

John B. Carse, United States Steel Corporation, New York City.

Hiram S. Chamberlain, president, Citico Furnace Co., Chattanooga, Tenn.

Dexter B. Chambers, secretary, Stewart Iron Co., Ltd., Cleveland.

A. S. Chisholm, assistant to president, American Steel & Wire Co., Cleveland.

E. A. S. Clarke, president, Lackawanna Steel Co., New York City.

W. H. Clingerman, general superintendent, H. C. Frick Coke Co., Scottdale, Pa.

Chas. C. Cluff, manager of sales, New York district, Carnegie Steel Co., Illinois Steel Co., and Tennessee Coal, Iron & Ry. Co.

L. E. Cochran, president, Youngstown Iron & Steel Roofing Co., Youngstown, O.

Burnham C. Colburn, secretary and treasurer, Canadian Bridge Co., Walkerville, Ont., Can.

Bertrand D. Coleman, resident director, Pennsylvania Steel Co., Lebanon, Pa.

E. S. Cook, president, Warwick Iron & Steel Co., Pottstown, Pa.

Daniel Coolidge, president, Lorain Steel Co., Johnstown, Pa.

W. E. Corey, president, United States Steel Corporation, New York City.

H. Coulby, president, Pittsburgh Steamship Co., Cleveland.

Theron I. Crane, Pilling & Crane, Philadelphia.

George G. Crawford, president, Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.

W. D. Crawford, vice president-general manager, LaBelle Iron Works, Steubenville, O.

Otis H. Cutler, president, American Brake Shoe & Foundry Co., New York City.

H. G. Dalton, Pickands, Mather & Co., Cleveland.

F. H. Daniels, chief engineer, American Steel & Wire Co., Worcester, Mass.

Stewart A. Davis, vice president, American Sheet & Tin Plate Co., Pittsburg.

Charles Deering, chairman, International Harvester Co., Chicago.

James H. Dempsey, Cleveland.

Thomas Devlin, president, Thomas Devlin Mfg. Co., Philadelphia.

W. B. Dickson, first vice president, United States Steel Corporation, New York City.

A. C. Dinkey, president, Carnegie Steel Co., Pittsburg.

William H. Donner, director, Cambria Steel Co., Pittsburg.

George F. Downs, general superintendent Lackawanna Steel Co., Buffalo.

T. J. Drummond, president, The Lake Superior Corporation, Montreal, P. Q., Can.

Philip S. Dyer, treasurer, American Horseshoe Co., Phillipsburg, N. J.

Howard N. Eavenson, chief engineer, United States Coal & Coke Co., Gary, W. Va.

R. H. Edmonds, editor, *Manufacturers' Record*, Baltimore.

J. S. Elverson, treasurer, Lehigh Car, Wheel & Axle Works, Catasauqua, Pa.

Mason Evans, treasurer, Youngstown Iron & Steel Roofing Co., Youngstown, O.

B. F. Fackenthal, Jr., president, Thomas Iron Co., Easton, Pa.

J. A. Farrell, president, United States Steel Exports Co., New York City.

William E. Farrell, vice president and general manager, M. H. Treadwell & Co., Lebanon, Pa.

E. C. Felton, president, Pennsylvania Steel Co., Philedalphia.

W. J. Filbert, comptroller, United States Steel Corporation, New York City.

Alvin I. Findley, editor, *The Iron Age*, New York City.

Henry S. Fleming, consulting engineer, New York City.

Wallace T. Foote Jr., director, Witherbee, Sherman & Co., Port Henry, N. Y.

Thos. J. Foster, president, National Bridge Co., New York.

Arthur A. Fowler, Rogers, Brown & Co., New York.

Lewis W. Francis, secretary, Witherbee, Sherman & Co., New York City.

Joseph H. Frantz, vice president and general manager, Columbus Iron & Steel Co., Columbus, O.

G. Watson French, president, Bettendorf Metal Wheel Co., Davenport, Ia.
J. W. Fuller, Jr., general manager, Lehigh Car, Wheel & Axle Works, Catasauqua, Pa.
Elbert H. Gary, chairman, United States Steel Corporation, New York City.
Dudley G. Gautier, D. G. Gautier & Co., New York City.
James Gayley, New York City.
Frederick C. Gedge, manager, Wire Mills, American Steel & Wire Co., Chicago.
E. G. Grace, general manager, Bethlehem Steel Co., So. Bethlehem, Pa.
Tracy W. Guthrie, president, Republic Iron & Steel Co., Pittsburg.
Edward M. Hagar, president, Universal Portland Cement Co., Chicago.
John L. Haines, assistant to vice president, Jones & Laughlin Steel Co., Pittsburg.
Daniel R. Hanna, M. A. Hanna & Co., Cleveland.
Charles Hart, Coatesville, Pa.
A. F. Harvey, assistant general manager, Pittsburg Steamship Co., Cleveland.
Hyatt S. Hazelton, Pickands, Mather & Co., Cleveland.
J. A. Hatfield, president, American Bridge Co. of New York, New York City.
Will L. Hayes, assistant manager, Wire Mills, American Steel & Wire Co., Cleveland.
August Heckscher, vice president, Eastern Steel Co., New York City.
Austin Heckscher, president, Richard Heckscher & Sons Co., Philadelphia.
Ledyard Heckscher, general manager, Richard Heckscher & Sons Co., Philadelphia.
Henry W. Heedy, secretary and treasurer, The Andrews & Hitchcock Iron Co., Youngstown, O.
Harry E. Higgins, treasurer and general manager, Cleveland Steel Co., Cleveland.
W. T. Hildrup, Jr., secretary and treasurer, Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa.
Frank Hitchcock, president, The Andrews & Hitchcock Iron Co., Youngstown, O.
George E. Holton, president, Bryden Horseshoe Co., Catasauqua, Pa.
J. H. Hoyt, Cleveland.
C. R. Hubbard, president, Wheeling Steel & Iron Co., Wheeling, W. Va.
A. F. Huston, president, Lukens Iron & Steel Co., Coatesville, Pa.
O. N. Hutchinson, treasurer and manager, Grand Crossing Tack Co., Grand Crossing, Chicago.
T. J. Hyman, secretary and treasurer, Illinois Steel Co., Chicago.
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Robert L. Ireland, M. A. Hanna & Co., Cleveland.
Alex. Jarecki, secretary, Jarecki Mfg. Co., Erie, Pa.
Joseph W. Jeffrey, vice president and general manager, The Ohio Malleable Iron Co., Columbus, O.
George W. Jewett, manager, Wire Mills, American Steel & Wire Co., Pittsburg.
Gilbert H. Johnson, treasurer, Isaac C. Johnson & Co., Spuyten Duyvil, N. Y.
Archibald Johnston, first vice president, Bethlehem Steel Co., South Bethlehem, Pa.
Benjamin F. Jones Jr., president, Jones & Laughlin Steel Co., Pittsburg.
Harry R. Jones, secretary and treasurer, United Steel Co., Canton, O.
Jonathan R. Jones, secretary and treasurer, Alan Wood Iron & Steel Co., Philadelphia.
William L. Jones, vice president and general manager, Jones & Laughlin Steel Co., Pittsburg.
J. S. Keefe, vice president, American Steel & Wire Co., Chicago.
I. A. Kelley, president, Ashland Steel Co., Ashland, Ky.
William V. Kelley, president, American Steel Foundries, Chicago.
Frank G. Kennedy Jr., president Logan Iron & Steel Co., Philadelphia.
Hugh Kennedy, iron manufacturer, Buffalo.
Julian Kennedy, mechanical engineer, Pittsburg.
Thomas W. Kennedy, president, Adrian Furnace Co., Dubois, Pa.
Severn P. Ker, president, Sharon Steel Hoop Co., Sharon, Pa.
David G. Kerr, second vice president, United States Steel Corporation, New York City.
Willis L. King, vice president and general sales agent, Jones & Laughlin Steel Co., Pittsburg.
Charles Kirchhoff, New York City.
Fred Krebs, general manager of sales, Cambria Steel Co., Johnstown, Pa.
Henry M. Leland, vice president, Cadillac Automobile Co., Detroit.
O. P. Letchworth, president, Pratt & Letchworth Co., Buffalo.
John T. Llewellyn, vice president, Chicago Malleable Casting Co., West Pullman, Chicago.
Franklin D. Locke, Buffalo, N. Y.
James Lord, president, American Iron & Steel Mfg. Co., Lebanon, Pa.
Thomas Lynch, president, H. C. Frick Coke Co., Pittsburg.
Samuel McClure, general manager, Stewart Iron Co., Ltd., Sharon, Pa.
William McConway, president, McConway & Torley Co., Pittsburg.
Cyrus H. McCormick, president, International Harvester Co., Chicago.
C. H. McCullough Jr., vice president and general manager, Lackawanna Steel Co., Buffalo.
Thomas McDonald, general superintendent, Youngstown District, Carnegie Steel Co., Youngstown, O.
William H. McFadden, vice president, Mackintosh, Hemphill & Co., Pittsburg.
George F. McKay, traffic manager, Toledo Furnace Co., New York.
Charles E. McKillips, special agent, Carnegie Steel Co., Pittsburg.
Francis C. McMath, president, Canadian Bridge Co., Walkerville, Ont., Can.
G. G. McMurtry, chairman, American Sheet & Tin Plate Co., New York City.
Charles MacVeagh, general solicitor, United States Steel Corporation, New York City.
J. C. Maben, president, Sloss-Sheffield Steel & Iron Co., Birmingham, Ala.
Clinton S. Marshall, manager, Worcester district, American Steel & Wire Co., Worcester, Mass.
Robert Mather, chairman, Westinghouse Electric & Mfg. Co., New York.
Samuel Mather, Pickands, Mather & Co., Cleveland.
William G. Mather, president, The Cleveland Cliffs Iron Co., Cleveland.
Thomas H. Mathias, superintendent roll department, Lackawanna Steel Co., Buffalo.
Daniel B. Meacham, Rogers, Brown & Co., Cincinnati.
Augustus F. Meehan, vice president, Ross-Meehan Foundry Co., Chattanooga, Tenn.
Eugene L. Messler, superintendent, Blast Furnaces, Jones & Laughlin Steel Co., Pittsburg.
George Mesta, president Mesta Machine Co., Pittsburg.
Charles L. Miller, vice president and general superintendent, American Steel & Wire Co., Pittsburg.
John P. K. Miller, chief engineer, H. C. Frick Coke Co., Scottdale, Pa.
John Mitchell, Cleveland Steamship Co., Cleveland.
Ralph D. Mitchell, Cleveland Steamship Co., Cleveland.
V. Mumford Moore, secretary and general manager, The Chisholm & Moore Mfg. Co., Cleveland.
J. Pierpont Morgan Jr., director, United States Steel Corporation, New York City.
Edmund W. Mudge, chairman, Phillips Sheet & Tin Plate Co., Pittsburg.
Robert W. Ney, manager wire mills, American Steel & Wire Co., Cleveland.
Francis E. Norris, superintendent, Sharon district, Carnegie Steel Co., South Sharon, Pa.
Earl W. Oglebay, Oglebay, Norton & Co., Cleveland.
Edwin N. Ohl, president, United Iron & Steel Co., Pittsburg.
Rudolph Ortmann, Ajax Forge Co., Chicago.
Edward O'Toole, general superintendent, United States Coal & Coke Co., Gary, W. Va.
John S. Oursler, general superintendent, New Castle & Sharon district, Carnegie Steel Co., New Castle, Pa.
W. P. Palmer, president, American Steel & Wire Co., Cleveland.
E. W. Pargny, president, American Sheet & Tin Plate Co., Pittsburg.
Leonard Peckitt, president, Empire Steel & Iron Co., Catasauqua, Pa.
John A. Penton, managing editor, THE IRON TRADE REVIEW, Cleveland.
George W. Perkins, director, United States Steel Corporation, New York City.
Hubert F. Perkins, president, Wisconsin Steel Co., Chicago.
Antonio C. Pessano, president, Great Lakes Engineering Works, Detroit.
John O. Pew, vice president and general manager, Youngstown Iron & Steel Roofing Co., Youngstown, O.
Jay Morse Pickands, Pickands, Mather & Co., Cleveland.
William S. Pilling, Pilling & Crane, Philadelphia.
Veryl Preston, president, Eastern Steel Co., New York City.
Charles S. Price, president, Cambria Steel Co., Johnstown, Pa.
Charles F. Rand, president, Spanish-American Iron Co., New York City.
Charles A. Rathbone, Buhl Malleable Co., Detroit.
James H. Reed, chairman, Carnegie Steel Co., Pittsburg.
David Reeves, president, Phoenix Iron Co., Philadelphia.
John Reis, assistant to president, United States Steel Corporation, New York City.
J. Leonard Replogle, assistant to president, Cambria Steel Co., Johnstown, Pa.
John V. W. Reynders, vice president, Pennsylvania Steel Co., Steelton, Pa.
Franklin B. Richards, M. A. Hanna & Co., Cleveland.
Chas. R. Robinson, general manager of sales, Lackawanna Steel Co., New York.
C. Snelling Robinson, vice president, The Youngstown Sheet & Tube Co., Youngstown, O.
Theodore W. Robinson, first vice president, Illinois Steel Co., Chicago.
Charles G. Roebling, John A. Roebling's Sons Co., Trenton, N. J.
Ferdinand W. Roebling, John A. Roebling's Sons Co., Trenton, N. J.
W. A. Rogers, Rogers, Brown & Co., Buffalo.
Willis J. Root, superintendent, Columbus Works, Carnegie Steel Co., Columbus, O.
Wallace H. Rowe, president, Pittsburg Steel Co., Pittsburg.
John L. A. Ruhl, assistant secretary, Roessler & Hasslacher Chemical Co., New York City.
John R. Russel, vice president, Great Lakes Engineering Works, Detroit.
Wm. Durham Sargent, president, Reading Steel Casting Co., New York City.
William B. Schiller, president, National Tube Co., Pittsburg.
Charles M. Schwab, president, Bethlehem Steel Co., South Bethlehem, Pa.
Isaac M. Scott, president, LaBelle Iron Works, Steubenville, O.
Jasper Holmes Sheadle, Cleveland.
Samuel B. Sheldon, South Bethlehem, Pa.
Louis A. Shepard, vice president, Titan Steel Casting Co., Newark, N. J.
Arthur J. Singer, assistant to president, Lackawanna Steel Co., New York City.
F. C. Smink, president, Reading Iron Co., Reading, Pa.
Cameron C. Smith, president, Union Steel Casting Co., Pittsburg.
Charles J. Snow, treasurer, Macbeth Iron Co., Cleveland.
Henry S. Snyder, second vice president, Bethlehem Steel Co., So. Bethlehem, Pa.
W. P. Snyder, W. P. Snyder & Co., Pittsburg.
Joseph T. Speer, president, Pittsburg Valve, Foundry & Construction Co., Pittsburg.
Powell Stackhouse, chairman, Cambria Steel Co., Wallingford, Pa.
Henry H. Stambaugh, president, The Brier Hill Iron & Coal Co., Youngstown, O.
John Stambaugh, secretary and treasurer, The Youngstown Steel Co., Youngstown, O.
Rollin C. Steese, secretary and treasurer, The Brier Hill Iron & Coal Co., Youngstown, O.
Francis Lynde Stetson, general counsel, United States Steel Corporation, New York City.
James S. Stillman, secretary and treasurer, Empire Steel & Iron Co., Catasauqua, Pa.
E. E. Stone, general purchasing agent, American Steel & Wire Co., Cleveland.
John M. Taylor, president, Taylor-Forbes Co., Ltd., Guelph, Ont., Can.
Moses Taylor, vice president, Lackawanna Steel Co., New York City.
William H. Taylor, publisher, 14 Park place, New York.
Rodney Thayer, vice president, Baldt Steel Co., New Castle, Del.
W. A. Thomas, president, The Thomas Steel Co., Niles, O.
A. W. Thompson, president, Inland Steel Co., Chicago.
George G. Thorp, vice president, Indiana Steel Co., Chicago.
John A. Topping, chairman, Republic Iron & Steel Co., New York City.
Richard Trimble, secretary and treasurer, United States Steel Corporation, New York City.
Jeptha H. Wade, Cleveland.
E. C. Wallace, president, Milliken Bros., Inc., New York City.
James C. Wallace, president, American Ship Building Co., Cleveland.
W. R. Walker, assistant to president, United States Steel Corporation, New York City.
W. L. Ward, Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
John Warner, president, Empire Iron & Steel Co., Youngstown, O.
George W. Watts, works manager, Canadian General Electric Co., Toronto, Can.
Ernest T. Weir, president, Phillips Sheet & Tin Plate Co., Weirton, W. Va.
J. F. Welborn, president, Colorado Fuel & Iron Co., Denver.
Charles P. Wheeler, vice president and treasurer, Pickands, Brown & Co., Chicago.

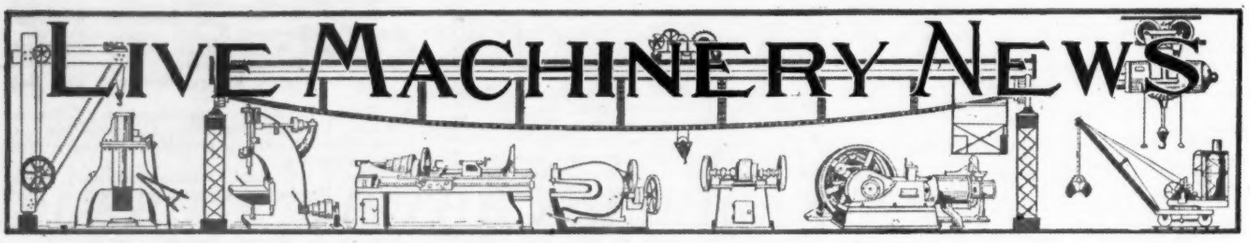
Walter H. Whiteside, president, Allis-Chalmers Co., Milwaukee.
John Hill Whiting, president, Whiting Foundry Equipment Co., Harvey, Ill.
George S. Whyte, president, Macomber & Whyte Rope Co., Chicago.
Hon. George W. Wickersham, Washington, D. C.
Homer D. Williams, general superintendent, Duquesne Works, Carnegie Steel Co., Duquesne, Pa.
George E. Wisener, general superintendent, Mingo and Bellaire Works, Carnegie Steel Co., Mingo Junction, O.

Frank S. Witherbee, president, Witherbee, Sherman & Co., New York City.
Hartley C. Wolle, general superintendent, Cambria Steel Co., Johnstown, Pa.
F. W. Wood, president, Maryland Steel Co., Sparrows Point, Md.
Walter Wood, R. D. Wood & Co., Philadelphia.
W. P. Worth, secretary and treasurer, Worth Bros. Co., Coatesville, Pa.
Charles H. Zehnder, president, Allegheny Ore & Iron Co., New York City.
E. M. Zehnder, president, Scranton Bolt & Nut Co., Scranton, Pa.

August Ziesing, president, American Bridge Co., Pittsburg.

HONORARY MEMBERS.

Robert Forsyth, The Rookery, Chicago.
John Fritz, South Bethlehem, Penna.
Prof. Henry M. Howe, Bedford, New York.
J. Pierpont Morgan, New York City.
James M. Swank, general manager, American Iron and Steel Association, Philadelphia.



CHICAGO

Western Machine Tool Trade Continues Quiet.

The local machinery market does not show any particularly new features this week. The principal trouble with the trade is not in lack of actual business, but apprehension regarding the future. Builders of machinery in Chicago, Milwaukee and surrounding cities are generally very well supplied with work, which indicates a healthy condition of affairs.

Arrangements are being made by the Sanitary District of Cook county, Ill., for the enlargement of its hydro-electric power plants and for considerable development of its system of transmission lines and sub-stations in order to more extensively cover the electric power field in the City of Chicago. It has also been decided to install electric-driven pumps in the various water pumping stations of the City of Chicago. It is stated that the present cost of pumping is 0.5 cents per thousand gallons, but that on a basis of electric pumps, with power purchased from the Sanitary District, the cost would be reduced to 0.3 cents per thousand gallons.

Work has been started on the foundations for a new power house at the Cleveland-Cliffs Iron Co.'s Negaunee mine, Negaunee, Mich. Trebilcock Brothers of Ishpeming have the contract for the foundation. The building will be 75 x 63 feet, 8 inches. The machinery installed will be operated by electricity, the plant being similar to the new plants at the Cleveland-Cliffs' North Lake properties, which are now in operation. The power will be procured from the generating plant operated at the Maas mine engine house.

Announcement has been made of a merger between the Gisholt Machine Co., of Madison, Wis., and Joseph T. Ryerson & Son, of Chicago, whereby the two interested concerns will become very closely affiliated. In furtherance of the plans formulated subsequent to this consolidation, extensive additions will be immediately made to the Gisholt plant at Madison, which will greatly increase the output and scope of the machine tool building business formerly carried on independently by the Gisholt interests.

The plant of the Globe Seamless Steel Tubes Co., Milwaukee, is under roof and some of the heavier machinery is commencing to arrive. It will be a number of weeks, however, before the plant is in a shape approaching completion. The completion of this plant will mean the opening of a new tube plant in the west, which in equipment and capacity is equal to anything in the Mississippi valley.

The Rockford Tool Co., Rockford, Ill., has been incorporated for $50,000, and expects to enter into the manufacture of tools and special machinery. The company is building a factory on Harrison avenue and Eleventh street, Rockford, 64 x 120 feet, one story. For the present the company will specialize in the manufacture of a 15-inch engine lathe.

The Colby Motor Co., capitalized at $1,000,000, has been incorporated in Iowa with headquarters at Mason City, Iowa. The company has purchased land near Mason City on which a building 150 x 450 feet, five stories high, will be built. J. H. Henry, designer of the Henry auto plant at Muskegon, Mich., will manage the new factory.

Holabird & Roche, 98 Jackson boulevard, Chicago, are receiving estimates on a 14-story warehouse, 90 x 200 feet, to cost $600,000, to be located at Lake and Market streets. The buildings will be provided with steam heating plant, electric elevators, pressure plumbing and fireproof windows. The University of Chicago is owner.

The Standard Cement Co., Charlevoix, Mich., is about to erect a plant for the manufacture of cement at Charlevoix. Plans have been completed for a steel building, 60 x 500 feet. The Soper Engineering Co., 628 Ford building, Detroit, is in charge of the work.

Bids will be asked for by the commanding officer of the Rock Island Arsenal, Rock Island, Ill., for a 150-horsepower, 50-volt, compound wound motor, complete with pulley, side rails and starting rheostat. The motor is to operate at 400 revolutions per minute.

The Milwaukee Machine Tool Co., Milwaukee, is moving into its new plant at Sixtieth and Mitchell streets, West Allis, Wis., and expects to be entirely moved within two weeks. The plant of this company has formerly been situated at North Milwaukee.

The National Lock Co., Rockford, Ill., is making some additions to its plant, but advises that no new equipment will be needed at present. The company states that it expects to rearrange the present machinery in order to give more room than heretofore.

Lord & Burnham, The Rookery, Chicago, have had plans prepared for a plant at Des Moines, to consist of iron working shop, woodworking shop, engine and boiler house. Later, a foundry will be erected.

The American Stamping & Machine Co., Chicago, has been incorporated to manufacture metal specialties and machinery; capital, $100,000. Incorporators, Geo. T. Eckart, Wm. Brown, John Jurchik.

D. S. Pentecost, architect, 78 Jackson boulevard, Chicago, has completed plans for a one-story blacksmith shop, 25 x 80 feet, at Armitage avenue and Ballou street, Chicago, for John O'Neill.

Alvord & Burdick, engineers, 140 Dearborn street, Chicago, are receiving estimates for piping, valves, hydrants, nozzles and hose for the Ravisloe Country Club, Homewood, Ill.

F. D. Postle, engineer, 279 Dearborn street, Chicago, is receiving estimates for a switchboard to be installed in the plant of the Hawks Electric Co., Goshen, Ind.

Frederick Sedgwick, 709-97 Clark street, Chicago, representing the American Cipher Machine Co., is looking for a suitable location on which to erect a plant.

NEW YORK

Improved Outlook in the Machinery Trade.

Machinery interests in the metropolitan district are running ahead of their September bookings at this time of the month, and a decidedly better sentiment is noticeable regarding the future than existed a month ago. Most houses are doing a fair business in small lots of machinery and feel that before very long some large lists will be put out by the railroads, which will swell the volume of business to at least normal proportions. The detailed statements of the large expenditures these interests must make on maintenance and improvements, laid before the Interstate Commerce Commission, by several presidents of important eastern roads, has exposed an enormous total of future business that will directly and indirectly be felt in the local market. Buying has been done in one and two-machine tool lots by the New York Central and the Pennsylvania railroads during the week, and by some of the large steel-making plants.

A representative of a large machinery house, which has several branches scattered over the United States, has just covered a large part of the central western and southern states, and reports noticeable improvement in those sections and feels that the trend towards greater activity is now well established. A significant feature in the east is the appropriation of $2,500,000 by the Boston & Maine Railroad Co. to build and equip extensive repair shops. The company's engineers are now at work on plans, which will include both locomotive and car repair shops. The location of the plant will be in the vicinity of Boston, and the works will probably be of the most modern type.

Recent sales of industrial locomotives made by the Lima Locomotive Works, 50 Church street, New York City, are as follows: One 18-ton locomotive to Burnham & Hooker Lumber Co., Hartford, Conn.; one 18 and one 32-ton locomotive for shipment to Porto Rico; one 42-ton locomotive to the New York & Pennsylvania Co., and one 20-ton locomotive to the Pacific Lumber Co., Mexico.

The borough council of Madison, N. J., has under consideration plans for the improvement of the present municipal electric light plant. The improvement proposed consists of an addition of three 2-phase, 60-cycle alternators; one 250-kilowatt, one 120-kilowatt, and one 70-kilowatt and switchboard for controlling same. H. S. Torrey is chief engineer.

The Bush Terminal Co., 100 Broad street, New York, has begun work on its new freight depot building at Twenty-ninth street, between First and Second avenues, Manhattan. The plans call for a concrete and steel structure, 100 x 98 feet, to cost approximately $300,000. Power machinery and an automatic sprinkler system will be installed.

The Hammer Drill Co. has been incorporated with an authorized capital of $125,000. This concern will manufacture mining, quarry and stone-making machinery. The registered office is 475 Bloomfield avenue, Montclair, N. J., and the incorporators are Henry M. Quale, Robert K. Seville, and Harry J. Christensen, all of Montclair.

Plans have been filed by William Flanagan, architect for the department of charities, for a one-story industrial school building to be erected on Randall's Island, New York. The main building will be 191 x 31 feet, and two extensions will be erected, 31 x 50 feet each. The cost will be about $60,000.

Considerable business is now pending in power machinery, but due to the small volume of inquiry manufacturers of this line of apparatus have been receiving for several months, competition is very keen and profits must be reduced to almost nothing to secure the business.

Bids are asked until Nov. 3, by James Knox Taylor, supervising architect, Washington, D. C., for installing a heating and ventilating plant in the new United States post office building, and for electric equipment for the New York City post office building.

The Fay Machinery Co., 126 Liberty street, New York, is in the market for a 100-horsepower engine.

The Wilkes-Barre (Pa.) Street Railway Co. is considering the erection of a new power house.

The Searchlight Gas Co., Pittsburg, will erect a large plant on Broadway, Camden, N. J.

CLEVELAND

Business Shows no Improvement—Inquiries Limited

Little business has been done in the local machinery market during the past week. Dealers report that only a few orders were placed, and these only called for one or two tools each. Inquiries are also light. These reports are borne out by manufacturers, who claim that the amount of new business on hand is smaller than at any time since the dull season of 1907. This is true especially with makers of heavy machinery, such as hoisting and unloading equipment. Makers of cranes have only a small amount of business on hand, while structural fabricators are still busy, but mainly on old contracts. A number of manufacturers of lighter machinery, however, find business fair, and, although not running to capacity, are inclined to be optimistic as to the future. The movement of second-hand machinery is slow; dealers report few sales and not many tools have been offered on the market recently.

The Damascus Brake Beam Co., Sharon, Pa., has a force of men engaged in overhauling its new plant in Collinwood, Cleveland, and expects to move its equipment from Sharon into the Cleveland plant about Dec. 1. The company has already purchased two second-hand punches and a bulldozer. Other new machinery will be purchased, but this has not yet been specified.

The Bishop & Babcock Co., 615 Superior avenue, Cleveland, will erect two new additions to its works. One of these will be one-story, 160 x 50 feet; the other, which will be an addition to the brass department, will be four stories, 113 x 47 feet. Both shops are to be in operation about Jan. 1. Most of the machinery has been purchased.

The W. S. Tyler Co., Cleveland, is building a large, three-story warehouse, opposite its plant on East Thirty-sixth street. No machinery will be purchased. The company reports that it did a record business in ornamental iron work during the summer months.

The Seneca Chain Co., Kent, O., will soon be in the market for machinery for its new plant at that place. No definite schedule has yet been made up, but the list will include bulldozers, planers, drill presses, lathes, steam hammers, etc.

The American Fork & Hoe Co., Cleveland, is planning to double the capacity of its Ashtabula plant.

MILWAUKEE

Tool Builders at Madison Busily Engaged.

Plans have been made for improving the Carnegie Fuel & Dock Co.'s coal dock on St. Louis bay, Duluth-Superior, Minn., which will involve an expenditure of $125,000. The Carnegie dock was finished last spring and is considered one of the most modern fuel-handling plants on the lakes, but its equipment was found to be inadequate. Another coal unloading bidge will be built, at a cost of $100,000, and a screening equipment will be added at a cost of $25,000. The new equipment will be operated by electricity, and will have a five-ton unloading bucket.

Reports from Madison, Wis., are to the effect that business conditions among the manufacturing concerns of that city are very satisfactory. With most of the concerns it is believed that the force of employes now at work will prove insufficient, and that before the winter is over more than 200 additional hands will be employed. Among the busiest plants are the Gisholt Co., the Madison-Kipp Co., the Scanlon-Morris Co., the Fuller & Johnson Co. and the Northern Electric Co.

The $400,000 plant, which is being erected at Milwaukee by the International Harvester Co., is well under way and local officials announce that it will be ready for occupancy early next spring. The building, which is 170 x 750 feet, and is said to be the largest building under one roof in Milwaukee, will be devoted entirely to the manufacture of gasoline engines, the specialty of the Milwaukee branch of the International Harvester Co.

Charles J. Anderson, Menominee, Wis., whose foundry was recently destroyed by fire, will remove to Marinette, Wis. With the aid of the chamber of commerce of that city, he has secured the old iron works building there, which will be remodeled and equipped with the necessary foundry equipment.

The S. W. Miller Piano Co., Sheboygan, Wis., which is erecting a new plant, will be in the market after Jan. 1 for electric motors and a general line of woodworking and other machinery. Bids have already been received for the heating plant.

Fred Lyon has purchased the Hans Madson Machine shop at New London, Wis. The new owner contemplates improving his plant.

POINTERS ABOUT NEW BUSINESS

(In order to assist the post office in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

New Buyers:—

The following manufacturing companies have filed articles of incorporation:

The Rockford Tool Co., Rockford, Ill.; $50,000; Levin Faust, Swan E. Anderson and Hugo L. Olson.

The Ryder Brass Co., Bucyrus, O.; $10,000; by Parmly H. Ryder, Arnold Ryder, E. H. Ryder, A. S. Lenthold, S. Lenthold.

The Peerless Machine & Stamping Co., Cleveland; $10,000; William A. Steinbrenner, George Sawitzke, J. A. Lannert, Carl L. Lechler, William J. Lechler.

The Pittsburg Metal Products Co., Pittsburg, Pa.; iron and other metal products; $10,000; by A. J. Barron, J. A. Beck and Albert K. Little, all of Pittsburg.

The Hart Clohan Co., Martinsburg, W. Va.; farm implements; $75,000; Charles Burdette Hart, Morgan Ott Hart, Wheeling, W. Va.; **Alex Clohan,** F. E. Wilson and Nat T. Frame, Martinsburg, W. Va.

W. H. Mickley Co., Manhattan; electrical engineer; machinist, tool maker, founder and manufacturer of machinery of all kinds; $2,000; John C. Quinn; William G. Austin, 39 Cortlandt street; William H. Mickley, 19 Thames street, both of New York City.

New Construction:—

The Bay View Foundry & Machine Co., Sandusky, O., has purchased additional property adjoining its present plant, and is contemplating some new construction.

Hugo Bilgram, Philadelphia, has taken out a building permit for a two-story machine shop, 40 x 98 feet, at 1217 Spring Garden street, estimated to cost $25,000.

The Aurora Automatic Machinery Co., Aurora, Ill., has secured a lease from the city, and will build on city property adjacent to its plant a large addition to be used as a blacksmith shop.

The American Car & Foundry Co. has taken out a permit to build an addition at its Wilmington, Del., plant, 72 x 192 feet, one story. It will be of steel and concrete and will cost, it is estimated, $8,550.

The Fox-Harris Machine & Supply Co., Pine Bluff, Ark., has had plans prepared for a building at Fourth and Louisiana streets, one story, 120 x 154 feet, for which contracts will be awarded within a few days.

The Baltimore & Ohio railroad has prepared plans for an addition to its shops at Keyser, W. Va., in which steel cars will be repaired. The building will be 50 x 300 feet, and will give employment to over 100 men. Heretofore, the Keyser shops have been maintained solely for the repair of wooden cars.

The Tofte Boiler Co., Houston, Tex., has purchased a property adjoining its present site, and in a short time will begin improvements which will double the capacity of the works. The officers of the company are: President, H. H. Tofte; secretary-treasurer, W. E. Nicholson; superintendent, Frank Williborg.

As soon as the new building of the Brown-Lipe-Chapin Co., Syracuse, N. Y., is ready for occupancy, the differential gear department at the Brown-Lipe plant, West Fayette and South Geddes streets, will be moved into it. The machinery is now being placed, and it is expected that the new shops will be operating by Nov. 1.

General Industrial.—

The J. W. Pohlman Foundry Co., Buffalo, has increased its capital stock from $10,000 to $25,000.

The Evan L. Reed Mfg. Co., of Sterling, Ill., has accepted an offer of cash and buildings offered by citizens of Manistee, Mich., and will shortly remove its plant to Manistee.

The Mattoon Machine & Foundry Co., Mattoon, Ill., has been incorporated and organized by Charles N. Coon, John Cantlon Sr., Oscar C. Miller, William R. Ripley and Raymond Coon, with $25,000 capital stock. While it was the original purpose to engage in a general foundry and machine business, yet the company will specialize in the manufacture of a steam valve recently invented by Messrs. Coon and Cantlon.

Orton & Steinbrenner Co., builder of locomotive cranes and grab buckets, has notified the citizens of Freeport, Ill., that it will remove its Chicago plant to that city if $30,000 in stock be subscribed. Peoria also aspires to secure the plant.

The National Elevator & Machine Co., Honesdale, Pa., advises that it sustained only a partial loss to its foundry building in a recently noted fire. The damaged portion has been rebuilt, no additional buildings will be erected nor will new machinery be required.

At the recent annual meeting of the F. B. Stearns Co., Cleveland, manufacturer of the Stearns motor cars, the following officers and directors were elected: President, F. B. Stearns; vice president, R. F. York; secretary and treasurer, Edwin McEwen; F. M. Stearns, E. A. Merritt, A. W. Thompson and Philip Wick, the latter succeeding his father, the late Myron C. Wick, of Youngstown, O. A cash dividend of 25 per cent was declared, compared with 12 per cent paid last year.

Fires:—

The foundry of the Oklahoma Iron Works, Tulsa, Okla., was seriously damaged Oct. 7, the loss being estimated at $2,000.

Part of No. 3 iron ore washer of the Sloss-Sheffield Steel & Iron Co., at Russellville, Ala., was destroyed Oct. 12, the loss being estimated at $12,000.

The plant of the Raymond Mfg. Co., manufacturer of springs, at Corry, Pa., was partly damaged by fire, Oct. 11. The loss is estimated at $25,000.

The machine shops of the Southern railway at Princeton, Ind., were badly damaged, Oct. 8, the loss being placed at $200,000. The electric light and power plants of all the shops were in the building that burned.

MECHANICAL CHARGING OF BLAST FURNACES

The Development of the Charger; the Requirements to be Fulfilled and Suggested Lines of Improvement

By Edgar J. W. Richards and Thomas Lewis.[2]

In our manufactures we have always been a conservative nation, and there has been a tendency to let other countries try experiments and develop new ideas, although there never has been a lack of inventive genius in this country. As in other things, so it has been in the matter of the mechanical filling of our blast furnaces, for although various classes of machines have been introduced, and their benefits proved almost in every other industry, yet at the blast furnace, which is in reality the prime factor in all our manufactures, we for the most part adhere to our old fashioned methods.

We will show you later a photograph of a mechanically filled furnace in operation at Lowmoor Iron Works, as far back as 1800, and we understand many years ago, the late Mr. Snelus had a mechanically charged furnace at the West Cumberland Works. It is, however, in America and Germany that the most attention has been devoted to the subject.

In America, mechanical methods were forced upon them, owing to the opening out of the famous Mesabi ore fields, the ore from which, being easily reduced, necessitated charging at such a high rate of speed as to be beyond physical endurance. The engineer was called to the assistance of the furnace manager to supply a means of keeping the furnace full.

The full extent of the besetting difficulties of the subject were not at first realized, and it was thought to be merely a question of elevating and emptying on to the bell the required charge at the proper rate. They soon found they were laboring under a delusion; furnaces burnt down at one side owing to irregular distribution (the tipping of the skip shooting the lumps across the hopper and dropping the fines on the near side), hot spots developed, linings were burnt out, casts were irregular in quality, slips occurred more frequently, and the furnace manager had a worrying time generally.

Necessity for Mechanical Charging.

With such defects recognized, steps were taken to overcome them, the result being that we have now diverse methods to give a better distribution, such as deflecting plates, double bells, revolving hoppers, etc., but in spite of all this, many furnace managers still look askance at mechanical chargers, and consider that in the majority of cases, the benefits to be derived are more than counterbalanced by objections peculiar to mechanical charging, which are not found where hand filling is in vogue.

The last sentence seems to throw some light on the road to be followed if mechanical charging is to be a success. It is believed that no one one will question the assertion that it is almost universally admitted that careful filling with the barrow, conscientiously carried out by experienced laborers, is the most successful way to charge, and if such a charger, having the latter functions, could be got to work mechanically in an efficient manner, the initial objection would be removed.

Others contend that for large outputs exceeding say 1,400 to 1,500 tons per week from one furnace, mechanical methods may pay, if they are not indeed absolutely essential, but for makes up to this tonnage, there is no necessity for any other means than manual labor. We do not agree with such a contention.

Wherever there is the human element, there is the liability to err, and therefore, there is no assurance that the distribution is going to be perfect, however carefully the fillers are instructed.

Even for comparatively small makes, we are convinced that a machine can be found that will answer all requirements, work with precision and exactitude, and generally be as

[1]Abstract of a paper read before the Cleveland Institution of Engineers, Middlesbrough, Eng.
[2]Glengarnock, Scotland.

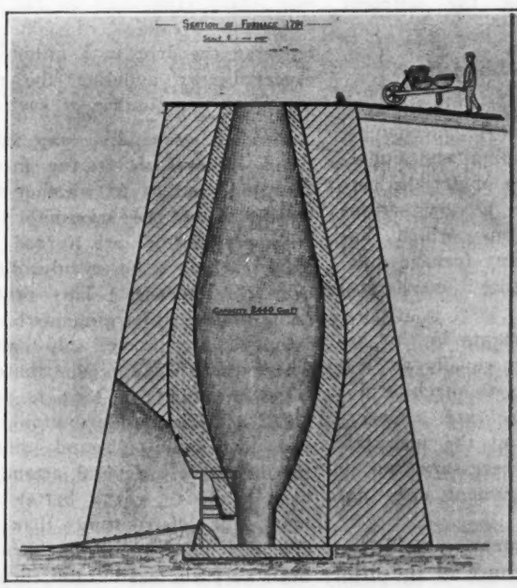


Fig. 1—Section of Original Lowmoor Furnace.

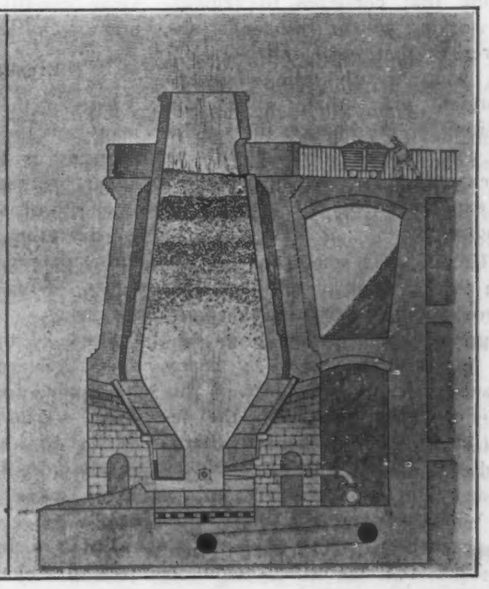


Fig. 2—An Old Staffordshire Furnace.

indispensable to the economical and regular working of the blast furnace as is the hot blast stove.

There is another point in this connection worth consideration. Any furnace is liable to work down quicker one day than another, and there is a difficulty in getting the fillers to keep the stock line up to the level, whereas, with mechanical filling, the rate of charging can always be regulated to suit the requirements. Moreover, a much greater regularity of working of the furnace can be obtained when the furnace is kept at one constant level; a difficult condition to fulfill with hand labor, but one which should always be possible with mechanical charging.

It must also be remembered that everything that conduces to regularity of working of the furnace brings us nearer to that ideal state of perfection, which is the aim of every metallurgist, viz.: that, given the composition of the charge, the results of the cast can be foretold with as much exactitude as can be obtained in an experiment by the chemist in the laboratory.

Mr. Uehling has stated that in his opinion 90 per cent of all blast furnace troubles are due to faulty charging apparatus, and he has been supported in this statement by many other authorities. The object of this paper is therefore to discuss the design of a suitable mechanical charger, and the faults which experience has shown are to be avoided.

The points of supreme importance which occur to us are:

(1) That the material should be put into the furnace with as little breakage as possible.

(2) That the material should be distributed evenly all over the surface of the stock.

(3) That there should be as little machinery as possible on the furnace top.

(4) That there should be no escape of gas during charging.

(5) That all the movements of raising and discharging the material, the lowering of the bell, and the means of distributing the charge should be capable of being controlled from one point.

(6) That the first cost and upkeep charges should be as low as possible.

(7) That the design should admit of some flexibility in details to suit local conditions, and the different methods of charging.

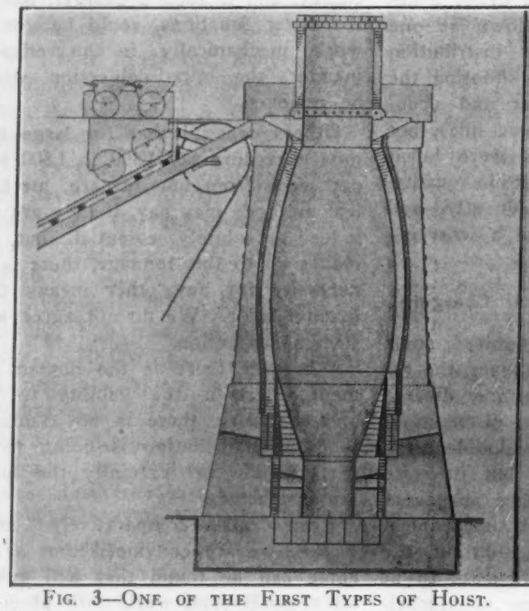


FIG. 3—ONE OF THE FIRST TYPES OF HOIST.

FIG. 4—FURNACE, SHOWN IN FIG. 1, WITH CHARGING PLANT.

Breakage of Materials.

One of the strongest objections to many of the systems of mechanical charging is the dumping and consequent breakage of the materials, particularly of the coke, a very serious consideration, and one which has hitherto prevented many furnace managers from adopting mechanical means.

Some of the arguments in this respect, however, might equally as well be applied to hand as to machine filling. Certainly there are chargers which do knock about the materials much more than is necessary, but in many cases this argument does not apply.

Often a furnace manager will object to a charger because of the drop of from 5 to 10 feet on to the bell, but if the stock line were visible the drop on to the bell would appear insignificant compared with the drop from the bell into the furnace.

On the other hand, many mechanical devices err, not so much in the height of any one drop, but in the number of such drops, the material being thrown this way and that way several times in its passage from the stock ground to the furnace, with the idea of getting the materials well mixed, but greatly to the detriment of the more friable portions of the charge, and for this reason the double bell types with connecting sleeve have fallen under a great deal of condemnation.

The ideal charger, then, must be one which eliminates as far as possible the breakage of materials by reducing the drop to a minimum, and especially by avoiding the multiplication of the number of such drops.

Furnace managers may have various opinions as to the method of charging, and as to whether the materials should be mixed or charged in layers, but all are agreed that the materials must be evenly distributed over the furnace. This principle is recognized in charging with barrows into the ordinary cup and bell, where the charge is distributed evenly all around the hopper, so as to give an even distribution of fine and lump and a good mixture of the materials. Several attempts have been made to get a better arrangement for distributing than Parry's cup and bell, but hitherto none has been very successful, and they require

too much attention to be of much service in mechanical charging.

Although several of these devices are very ingenious, yet by studying the conditions in each individual case, the authors are convinced that a size of bell can be got for any furnace, which can give give quite satisfactory results so far as radial distribution is concerned, provided other parts of the furnace are proportionate, and certainly nothing simpler than the cup and cone can be devised.

It is when we come to the circumferential distribution that we have to give the matter more careful consideration, for with the high pressure and working speed of the modern furnace, a very slight difference in control that we can do this, otherwise we are going to discount the advantage gained at the furnace top by introducing trouble in the furnace itself.

As before mentioned, it is almost universally admitted that no better distribution can be got than by hand filling, if it is carefully and conscientiously carried out, and the aim in mechanical charging should be to approximate as nearly as possible the conditions of hand charging.

Gearing on Furnace Top.

The upkeep of elaborate gearing on a furnace top, exposed to the inclemencies of the weather, and to heat, dust and gas, is a costly item. To

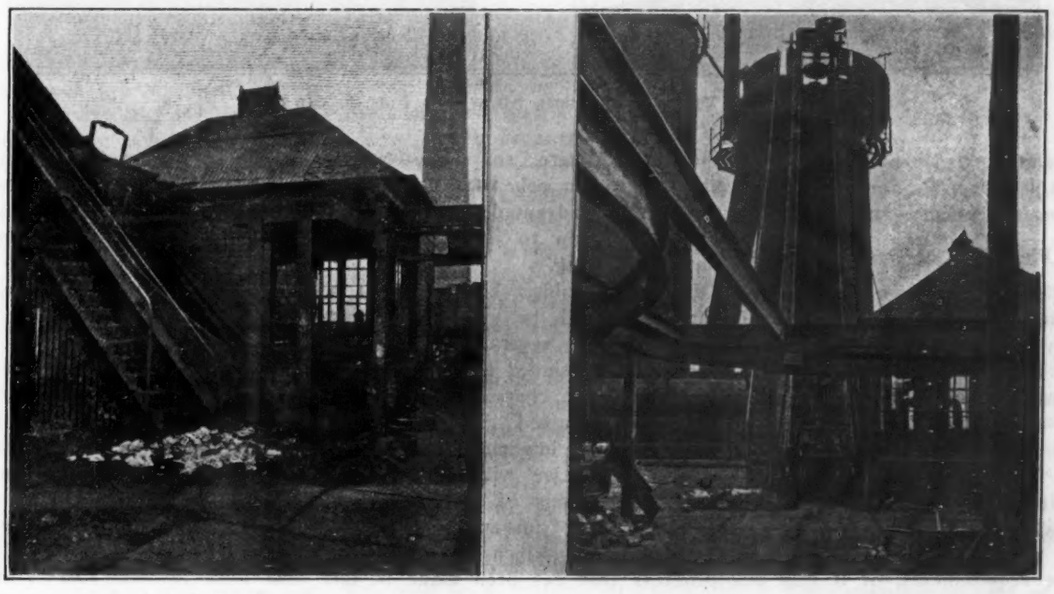


FIG. 5 THE ONLY MECHANICAL CHARGER IN SCOTLAND. FIG. 6.

the density of the materials at one point may cause an infinite amount of trouble. For example, a bell which swings slightly off the center for a short period has been found to be sufficient to destroy the lining at one side, by leaving a freer passage one way than another. Another case is on record where the charge was deposited at four points on the bell continuously, and it was found that the furnace lining burnt out to a rectangular shape, the angles of the rectangle corresponding with the points midway between the dumping point where the percentage of lump was highest. However carefully the charge is deposited, it may yet happen that the stock line becomes uneven, and it may be found necessary to fill up one part of the furnace, or, to use the furnaceman's phrase to "put in blanks." We must then, in designing a charger, have such a method of make a serviceable charger, some gearing is necessary in order to distribute the charge, but this should be reduced to a minimum, and as much as possible protected from the deteriorating influence mentioned above.

Let us devote a little time to the question of the escape of gas from the furnace top during the lowering of the bell, if no means is used for preventing this.

Putting aside other considerations for a minute, look at what the loss of gas alone means in times when every cubic foot is either a marketable asset, or of considerable value in the works for heating stoves, firing boilers, or driving gas engines.

Take a furnace with an output of say 200 tons per day, or say with a total burden of 800 tons per day, and let it be assumed that each hopperfull represents 15 tons, then in the course of a day the bell is lowered 53 times, and gas is lost on each day's work to the amount of about 20 to 25 minutes' production. For larger outputs the loss would, of course, be proportionately greater. Besides the actual loss, we have to consider the effect on the works plant. This is so well known to you as to need no description.

It may be said that mechanical charging is not the only way to eliminate this evil, which we readily admit. Several devices have been used to prevent the escape of gas, even with barrow charging.

One point of advantage in a closed top soon becomes evident when a bell sticks for any reason, as it prevents the far from beautiful pillar of fire and smoke which is too frequent a feature of our landscape.

The prevention of gas escape becomes absolutely imperative in many mechanical chargers where there is a head gear over the hopper.

That the control of all the mechanism, raising and lowering of the bell, distribution, etc., should be concentrated at one point is so apparent as to need no arguments to support the statement, and the perfection attained by instrument makers in the manufacture of recorders and indicators, makes it a simple matter to arrange for a central control.

Capital and Upkeep Cost.

The first outlay, and the cost of upkeep should be a minimum and the charger which can combine efficiency with low cost is of the most commercial benefit. With the complicated gearing in use on some charg-

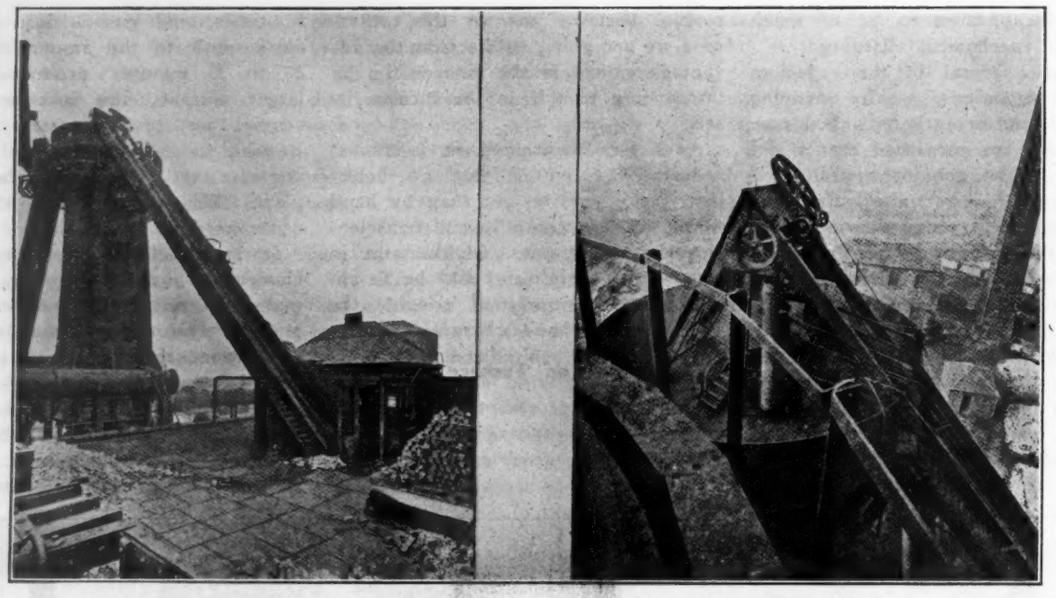


FIG. 7 OTHER VIEWS OF CHARGER SHOWN IN FIGS. 5 AND 6. FIG. 8.

ers, the gain to the manufacturing department is offset by the extra cost of keeping the plant running.

Flexibility of Design.

As different ores may require different methods of charging, or managers may have their own ideas as to how the materials should be put into the furnace, it is advisable that a charger should be capable of being modified in details to suit local conditions. Thus, at one place it may be required to take up a skip with about say a 60-ton burden, and at another place a smaller skip may meet the requirements, or it may be preferred to send up the ordinary barrow to be automatically discharged. Where so many works have their own coke ovens, it would also be an advantage to send the coke oven skip to the top without further handling.

It is preferable, therefore, that a charger should be capable of embracing these several requirements, and not be designed to suit one particular form of charging only.

Having discussed the chief points of interest and importance in mechanical charging, we will now look at some illustrations of different methods of filling furnaces, mechanical and otherwise, which will show the progress that has been made in this direction.

Fig. 1 is a copy of an old drawing of one of the original Lowmoor furnaces, built in 1791, and the method of charging by baskets, in a manner similar to that in use at many cupolas at the present day.

Fig. 2 shows an old type of furnace filled by a four wheeled bogie; the filling is effected from one side, a method in vogue in Staffordshire in the early seventies. This system was altered by the late Sir Lowthian Bell to charging from four points, which effected a radical improvement both in economy and output, and is referred to by him in his papers on blast furnaces, published in the *Iron and Steel Institute Journal* of 1872.

The bank behind the furnace, which was an essential feature of all blast

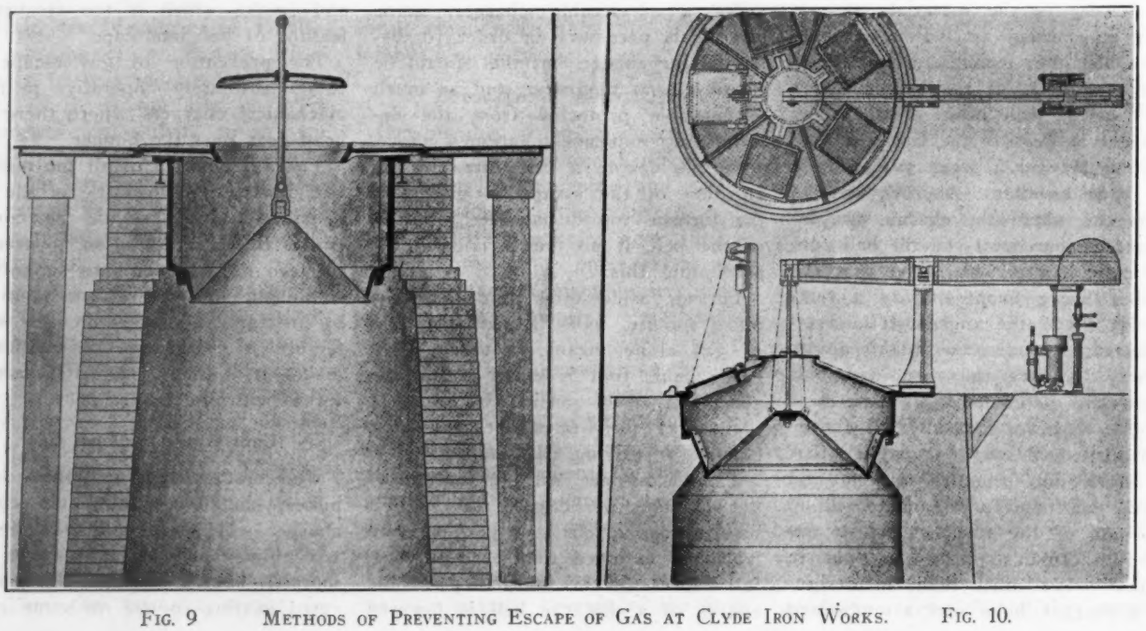


FIG. 9 METHODS OF PREVENTING ESCAPE OF GAS AT CLYDE IRON WORKS. FIG. 10.

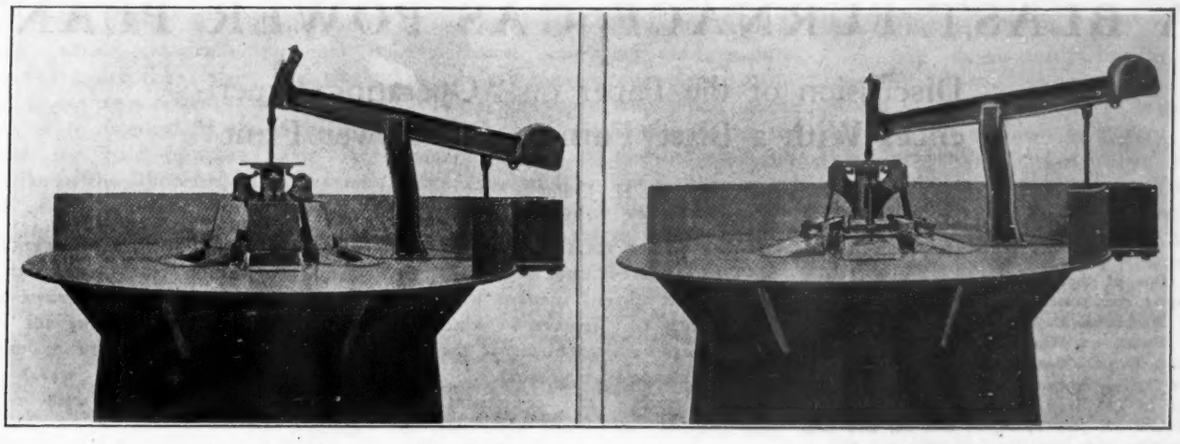


FIG. 11 TOP PATENTED BY THE AUTHOR. FIG. 12.

furnaces at one time, should also be noted. As furnaces were raised in height, or built in localities where there was not a convenient hill, it became necessary to use some description of hoist, and Fig. 3 shows one type of hoist—an inclined plane with a level staging on which the barrows were placed.

This type is shown in place of the usual vertical hoist because in mechanical charging an incline is always used, and it is interesting to note the points of resemblance between this and Fig. 4, showing the mechanically charged furnace at Lowmoor already referred to.

This arrangement was adopted in 1800 in place of the basket filling, already described, and the method of working was as follows: The four-wheeled trucks seen in the photograph were filled with the charge and brought on to the lower staging, from which they were run on to the traveling carriage on the incline. This carriage has a frame running on four wheels on the track, and an inner swinging frame pivoted on the sides of the carriage, this inner frame receiving the truck, which was secured in position. On running the carriage up the incline, two pulleys on the front of the swinging frame engaged with two projections on the rail, thus tipping the contents of the truck into the furnace.

Although not in chronological order, it is interesting for the purpose of comparison to note the next four views, Figs. 5, 6, 7 and 8, which show a charger at present in use at the blast furnaces of the Langloan Iron & Chemical Co., Coatbridge, this being the only mechanical charger in use in Scotland.

Figs. 9 and 10 show different methods of preventing the escape of gas in hand-filled furnaces at the Clyde Iron Works, and at the Ardeer Iron Works, respectively.

The top shown in Figs. 11 and 12, is one patented by one of the authors of this paper.

(To be continued.)

A British Railway Locomotive Works.

The principal works visited during the recent meeting of the Iron and Steel Institute at Buxton, England, was to the Crewe locomotive works of the London & Northwestern Railway. The number of persons employed at the Crewe works for construction and maintainence of engines is 7,579, and the total wages paid for the 12 months ending June last amounted to $7,421,000. There were produced: steel tires, 5,758 tons; axles, 2,208 tons; rails, 34,542 tons; ingots, 69,410 tons; cast iron chairs, 14,587 tons. The number of locomotive engines on the road is, passenger, 994; freight, 2,051; number of locomotives built per year, 90; repaired, 2,275. The company owns 845 workmen's cottages, and supplies gas and water not only to its own works, but to the whole town. The area comprises 137 acres, of which 48 are covered in. In the Siemens-Martin house there are seven 25-ton, and two 35-ton melting furnaces with up-to-date equipment capable of producing 50,000 tons of steel per annum. One of the largest shops is the boiler shop, measuring 673 feet long, and turning out 200 new boilers per annum, while repairing 3,000 others. Although the company has built 8,000 boilers, it has never had a boiler rupture. Large quantities of steel bridge girders are also turned out. There are eight erecting shops, and at the time of the visit a 65-ton engine was being carried about the shop by two cranes. In the tire mill about 650 tires are turned out per week.

The steel foundry is equipped with two 10-ton steel melting furnaces, and the iron foundry with seven cupolas. The tender shop is 530 feet long, and one of the finest shops on the ground. Other departments are the pattern shop, coppersmiths' shop and nut and bolt shop. A special department is devoted to signals, and especially to interlocking apparatus. Of this equipment the largest is in use at Euston double signal cabin, which contains 288 levers. Electricity is liberally employed throughout the works, and very good use is made of the electrical welding process, which, for some purposes, has entirely replaced the old-fashioned smith's forge.

The forge is fitted with hydraulic forging presses with electrical turning over gear, besides steam hammers up to 8 tons weight. The tire mill can roll up to 8 feet 9 inches in diameter.

Capture of Australian Rail Order.

The following account of the manner in which an American company secured a steel rail order in Australia was taken from a report made by a trade commissioner to the Canadian department of trade and commerce:

For the requirements of the state railways, the Victorian government recently accepted the tender of the Lorain Steel Co. of the United States for approximately 20,000 tons of 80-pound steel rails and 1,800 tons of fish plates. The rails were quoted at $32.73 a ton of 2,240 pounds and the fish plates at $42.46 a ton, duty paid and delivered ex-ship at Melbourne. The customs duty is 15 per cent in the general tariff and 10 per cent if the rails are made in the United Kingdom. In all, nine tenders were received from British, German and United States firms. It is obvious that the successful tenderers secured an exceptionally favorable freight rate to obtain the business. The government of Queensland is in the market for rails and fish plates. Particulars respecting orders for railway materials are available upon application to the agent general for each Australian state in London.

A BLAST FURNACE GAS POWER PLANT

Discussion of the Paper on "Operating Experiences With a Blast Furnace Gas Power Plant"

By H. J. Freyn.[1]

(Concluded from last issue.)

(One of the most interesting and valuable papers ever presented to the American Society of Mechanical Engineers was that of Heinrich J. Freyn, on "Operating Experiences with a Blast Furnace Gas Power Plant," presented at the spring meeting, 1910, and published in full in The Iron Trade Review for June 16, 23 and 30; July 7, 14, 21 and 28, and Aug. 4, 1910. The widespread interest taken in this paper and the numerous inquiries for copies of The Iron Trade Review containing the paper demand that the subject be completed by the publication of the discussion.)

The governing mechanism has also been improved to such a degree that all principal builders are ready to guarantee successful parallel operation of 60-cycle alternating current generators. This is also an improvement, but it came too late to influence the characteristics of the principal installations now in operation. At these plants the 25-cycle system was selected of necessity and must now be adhered to because it is too thoroughly established to permit of change.

American Blowing Engines Superior.

Still another important improvement in detail which is distintively American is the kind of cylinder used in large gas blowing engines. The blowing cylinders I saw on most of the gas engines of Europe, I consider the poorest part of the whole installation. A large proportion of these cylinders have the old type mushroom poppet valves for both inlet and discharge. While these may have been fairly well suited to the low blast pressures carried at most of the European plants, they are wholly unsuited to American conditions and to use them on gas engines here would be going back to the practice of 15 or 20 years ago. In order to get the most efficient results from a gas blowing engine, mechanically operated valves are necessary. This fact has been fully appreciated by American designers and some splendid examples of cylinders fitted with this type of valve have been produced. The equal of these American blowing cylinders with mechanically controlled valves is not made anywhere in the world and their use facilitates higher rotative speeds, which in turn reduces unit first cost and floor space. Speed control for blowing engines is a feature in which the best American engines equal the best used in Europe at present.

Gas cleaning, the construction of gas engines, and their operation are all now well understood in this country. The engineering problems involved are appreciated, even though they are not all solved. The commercial features involved are not of the most importance because a gas engine installation will in this country, for years to come, be a very expensive installation per unit of capacity. The price of fuel at all blast furnace plants in this country is low compared with what it is in Europe. The manager, in considering gas engines, must face the American aspect of high plant cost and low fuel cost. In this connection any improvement such as forced-feed lubrication, mechanically-controlled air valves, etc., which facilitates higher piston speeds, is an improvement which makes the large gas engine more generally available for consideration in American plants. What is required is to increase the earning capacity of any given unit or installation. High load factor at nearly continuous operating conditions is one of the principal requirements for gas engine plants. It will therefore be seen that while a collection of data as given in Mr. Freyn's paper is of great interest from an engineering standpoint, it is also of particular importance in its bearing on the commercial use of gas engines, in other words, it is a record of the efficiency or output of each principal part of the power plant, so that it is always known whether or not the installation is maintaining the best operating efficiency consistent with the operation of the works which it serves.

The Author's Reply.

The Author: — As Mr. Maccoun states, all large gas engines built in this country are of the side crank type, as this design was insisted upon by the steel works' engineers, and it cannot be denied that the side crank design proved to be very satisfactory and has many advantages over the center crank construction, but it should not be overlooked that it makes American gas engines considerably heavier and more expensive than European engines, which are without exception built with center cranks.

Regarding the question of governing gas engines, the governing by constant mixture is decidedly favored by American engine builders, and it appears that this system gives more satisfactory results in our practice than the so-called constant-compression-stratification method of governing.

Low Grade Oil Satisfactory.

I cannot agree with Mr. Maccoun that it is of such great importance to use some particular brand of cylinder oil for lubricating gas-engine cylinders. At the plant under discussion very excellent results are being obtained by the use of standard gas engine oil, which has about the following characteristics:

Viscosity. Tagliabue.	Flash point. Degrees Fahr.	Fire point. Degrees Fahr.	Specific gravity.
79.1	395	456	0.912

This oil is considerably less expensive than the special heavy oils suggested by Mr. Maccoun, whereas the quantity consumed is not very much greater, so that the net result is a material economy in the cost of lubrication. Frequent cylinder examinations have proved that the use of standard gas engine oil does not entail carbon deposits, since the oil is burned up completely, not leaving any residue in the counterbore nor under the piston rings. This, in my experience, cannot be said of the high-priced oils which, in order to obtain the high flash and fire points, must necessarily contain heavy hydrocarbons.

In regard to the amount of power obtainable from blast furnace gas, I think that the figure of 25 horsepower per ton of pig iron produced in 24 hours is pretty generally admitted to be a reliable basis for general calculations of the available power. It is true that this figure does not apply in every particular instance, and especially not in cases of plants having

[1]Illinois Steel Co., Chicago.

less than two or three blast furnaces. There are plants in existence, however, where practically no coal is burned under the boilers, and where all power requirements for the mills are being supplied by the excess gas from the blast furnaces. The Gary works of the Illinois Steel Co. exemplify this statement.

Mr. Maccoun is perfectly correct in maintaining that the gas engine is not the universal panacea for the needs of a blast furnace plant. In isolated plants, for instance, where a large proportion of the gas produced by the furnaces must go to waste simply because there is no field for its utilization, and where the gas is therefore of no value, the installation of costly gas engines may be uneconomical and undesirable. In other plants there may be old steam engines in operation which are running so satisfactorily, though not economically, that they may render good service for years to come. In such cases it would be a waste of money to discard these engines and to replace them by gas engines, since the low-pressure steam turbine is available to improve materially the thermal efficiency of such plants.

When Cleaning Becomes Uneconomical.

In connection with the question which has aroused most of the discussion, namely, the preliminary cleaning of blast furnace gas, it seems to be the unanimous opinion, brought out by Messrs. Morgan and Uehling, that it is obsolete practice to use raw blast furnace gas for any purposes about a blast furnace plant. It is generally recognized today that the gas for hot blast stoves and boilers should be cleaned to prevent the deleterious effect of the flue dust on the checker brickwork in the hot blast stoves and on the boiler flues. Opinions, however, are divided as to the degree to which blast furnace gas for these purposes should be cleaned, as well as to how this cleaning should be performed. According to the information obtainable on the subject at present, it does not seem possible to clean blast furnace gas by a dry process alone to such a degree of cleanliness as is claimed to be desirable in some of the discussions.

While it would seem consistent to assume that the benefit derived should increase proportionally with the degree of cleanliness of the gas, this is not so, since the ultimate economy is not only dependent upon the increased life of the checker work in the stoves, the high heats obtainable and the reduced labor of cleaning stoves and boiler flues, but also to a very great extent upon the cost of installation, operation and maintenance of a gas-washing plant.

The discussion of this phase of the problem of gas cleaning bears out the general conviction that if blast furnace gas could be sufficiently cleaned by a dry process only, such a cleaning plant could be installed, operated and maintained at a much lower cost than if wet scrubbers, pumps, fans, etc., were necessary to accomplish the purpose in view. My opinion is that dry cleaning of the blast furnace gas can be most effectively accomplished in an apparatus fulfilling the following three conditions:

a Reduction of temperature of the gas.

b Sudden change of direction.

c Sudden reduction of velocity.

As explained in the body of the paper, a reduction of temperature of the gas can be accomplished without expense by the use of unlined gas mains. Too much importance should not be attached to the advantage of preserving the sensible heat of the gas, and calculations at the plant under discussion have shown that the loss due to reduction to atmospheric temperature does not exceed 8 per cent. On the other hand any reduction in temperature of the gas is coincident with a corresponding reduction of moisture, a very important factor in the economical burning of the gas in stoves and under boilers.

A New Type of Dry Cleaner.

The design of any effective dry cleaner should make it impossible for the dust to be stirred up after it is once deposited and this implies provision for carrying off the separated flue dust in such a manner that it is protected as much as possible from the effect of slips and the tendency of the gas current to entrain the dust particles. Any dry cleaners based on the action of centrifugal force are necessarily much more effective than the old type dust catchers, wherein the separation of the dust occurred merely by the reduction of velocity in voluminous chambers. Granting the above requirements for an effective dry cleaner, the horizontal dust separator described by Mr. Morgan must prove to be a very efficient dry cleaner.

At the plant under discussion a great deal of experimenting on a large scale was done in connection with this problem. As explained in the body of the paper, very voluminous dry dust catcher of the tangential type were installed at all furnaces, but it was found that the efficiency was comparatively low.

A new development in the dry cleaning of gas is now being perfected at this plant, and it promises to solve the problem in a very simple, inexpensive and effective manner. This is the Brassert-Witting dry dust cleaner, which combines in one apparatus the above named principles of successful dry cleaning, since it is unlined, makes use of centrifugal force, positive friction, reversal of direction and sudden expansion of the gas while protecting channels take the dust out of the path of the gases. These dust catchers are inexpensive and the operating cost is practically nothing, as they discharge the dust directly into railroad cars. The advantage of this system, aside from the low cost, is the fact that all the dust is recovered in a dry condition, doing away with the nuisance of sediment in sewers, rivers, etc. It has been shown in actual practice that one of these 10-foot dry cleaners will take out about twice as much dust as a large 40-foot dry dust catcher of the system preceding it, and with three of these cleaners in series, it is possible to obtain a cleanliness of less than one-half grain of dust per cubic foot.

How the Wet Scrubber Operates.

With reference to S. K. Varnes' contribution on the question of wet gas cleaning, it is unquestionably true that this object can be satisfactorily accomplished in wet scrubbers other than the one described in the paper. Whether, however, such wet cleaners are more effective and cheaper in operation is yet to be proved. The four wet scrubbers in the plant under discussion, now operating in parallel, show an efficiency of over 90 per cent for the last three months. The reduction of gas pressure to which Mr. Varnes refers is of no consequence since it does not exceed 1 inch of water column.

I cannot imagine a better distribution of water than that obtained in a tower filled with hurdles, since the water falling from hurdle to hurdle on its way from the top to the bottom of the wet scrubber is broken up again and again into a very fine mist so that practically every particle of gas must come into thorough contact with the water. I do not believe that the dust particles have to pierce a water film in order to be removed from the gas, but that the action which takes place in any type of scrubber consists in the wetting and weighing down of the dust

particles by microscopical water drops in suspension.

The influence which impurities in the gas have on the cylinder wear can practically be disregarded if the engine gas is thoroughly cleaned in a modern cleaning plant. Conditions have changed materially in this respect in the last eight or ten years. Before adequate gas cleaning plants were in use the amount of impurities carried into the engines was so great that the dust and the lubricating oil formed a grinding material which caused the cylinders to wear out in a distressingly short time. Cylinder wear in modern blast furnace gas engines is not primarily due to the dust, but to the material of the cylinders, piston ring design, lubrication, etc.

Gas Engine Superior to Steam.

Mr. Stott mentioned that he has obtained with a combination of reciprocating steam engines and low pressure steam turbines, a thermal efficiency of over 21 per cent. It is evident that Mr. Stott is referring his thermal efficiency to the total amount of heat contained in the steam at the engine throttle and that he does not take into account the losses occurring by steam transmission between boiler house and engines, nor the efficiency of the boilers themselves and the losses in the boiler house. Inasmuch as in a blast furnace plant the blast furnace gas is the available fuel, which in one case is used directly by combustion in the gas engine cylinders and in the other case indirectly under boilers for raising steam, a fair comparison of the efficiencies of these prime movers can be made only on the basis of the amount of heat units contained in the gas delivered at the gas cleaning plant in the former and at the steam boilers in the latter case. Assuming that the combined losses in boilers and by steam transmission to the engines amounts to 35 per cent, so that the combined efficiency of boilers and steam pipe is 65 per cent, the thermal efficiency of Mr. Stott's installation would not exceed 13.7 per cent compared with about 21 per cent realized with our gas engines.

The latter figure, moreover, is not a value obtained by one or a series of individual tests, but is the average of the results obtained in actual commercial operation of the plant during the period of one year; nor is this figure in any way exceptional, as there are gas engine plants in existence abroad where average thermal efficiencies of 25 per cent and more are being realized. There is no reason why with mechanically perfect engines of modern design these figures should not be duplicated and even exceeded in this country.

Mr. Coleman's discussion was submitted to C. J. Bacon, who states that the matter of which Mr. Coleman speaks, namely, accounting for losses in the venturi meter, was not included in the paper, as there was no definite information available on the relative losses due to eddy currents, location or pressure holes, imperfect workmanship, etc. Mr. Bacon fully agrees with all that Mr. Coleman says.

It is with particular pleasure that I refer to W. E. Snyder's remarkable contribution as one of the most valuable accounts of European gas engine practice which has yet appeared in print and it will undoubtedly prove of great interest and value to the profession. Having had experience in both European and American gas engine practice and having actively witnessed the early development of the blast furnace gas engine here and abroad I feel competent to endorse the views expressed by Mr. Snyder in every particular.

In preparing my paper I purposely refrained from broaching the subject of gas engine design and construction; nor did I yield to the temptation of relating my personal experience with gas engine operation here and abroad, well knowing that my reference to these subjects would have brought out a veritable avalanche of discussions on the part of both gas engine builders and users. In line with this reasoning I do not care to take up point by point Mr. Snyder's remarks on the construction of certain gas engine parts, but I wish to elaborate a little on one statement which is in line with the subject matter of my paper.

Profiting by Experience of Others.

It is an established fact that all gas cleaning plants installed in this country within the last five years have been very successful and practically free from trouble. This is largely, if not exclusively, due to the insight of American steel works managers, who recognized that in view of what had been done in Europe along this line any attempts to solve the problem inadequately by carrying on lengthy and costly experiments would have meant wasting money and retracing the steps which their European colleagues had already taken. Instead they willingly took advantage of the experience of others and adopted European methods and apparatus, perfecting them to meet their own conditions. It is equally true that many of the difficulties encountered in the operation of our gas engines in this country would have been avoided if this principle of profiting by the experience of others had been more closely adhered to in designing and building American gas engines.

It is very gratifying to note the close coincidence of the results obtained in American and European operating practice, especially in regard to the purification of blast furnace gas and the lubrication of gas cylinders.

Practical Use of Abrasive Wheels in Foundries.[1]

The principal factor in the successful adoption of an abrasive wheel is a knowledge of the practical operating conditions under which these wheels should run for economical results.

The first essential in the successful adoption of a grinding equipment of any size is the disposition on the part of the management making the installation to operate under conditions to produce practical results.

Safety Collars.

The method of controlling the factor of safety to the operator should be determined, whether by safety collars, which are tapered if possible on the concave side ¾ inch to the foot, so that the wheels may be tapered convexley accordingly. In this case, where the nature of the work will permit, the maximum amount of wheel exposed beyond the edge, or rim, of these collars should be 2 inches, and the collars changed as the wheels wear; or by the use of substantial hoods in cases where it is necessary to use wheels with straight sides, owing to the nature of the work to be ground, or by the use of both hoods and collars. Wherever possible, the general results will be more satisfactory, when the safety collars are used. If a wheel breaks in service, these collars, which should be at least ¾ inch thick and made from cast steel for wheels 24 inches in diameter, will hold the pieces together.

Grinding Stands.

After determining the size of the wheel, it is necessary to have machines solidly set on good foundations with a heavy spindle in long bearings that can be kept well-lubri-

[1]Abstract of a paper presented at the October meeting of the Pittsburg Foundrymen's Association.

cated, having all vibration eliminated when carrying the load of the wheels with the additional weight of the heaviest safety collars that are to be used. For a 24 x 2-inch wheel, with these safety collars, the spindle should be at least 2¼ inches between the flanges where the wheel is mounted, and for 24-inch wheels heavier than this, the spindle should be at least 2½ inches diameter and the bearings not less than 12 inches long. This applies to floor stands for foundry practice, especially where the work is of a heavy nature. In addition to this, in all steel foundries, excepting crucible plants where nothing but very small castings are made, and many malleable iron foundries where there is sufficient work of a heavy nature, the most economical machines that can be installed are swinging frame grinders. These machines should be driven with fiat belts, having a spindle at least 2 inches in diameter, for carrying 18, 20 or 24 inches wheels. The wheel spindle should be driven by at least a 4-inch double belt.

Power.

After investing in this equipment, ample power for driving these machines should be provided to keep the wheel operating under the proper speed while it is at its highest pressure of service. On the floor stand, operating two 24-inch wheels, where two men are working, 10-horsepower should be provided, and on a swing frame grinder operating one 20-inch wheel, 2 or 2½ inches face, if driven by belt power, the countershaft should be driven by a 6-inch belt. In operating one of these machines, with a motor connected to the countershaft, which must drive the belts and absorb the friction necessary, not less than a 7½ horsepower motor should be used, preferably 10-horsepower; but where the motor is mounted on a bracket at the elbow of this machine, the belt being connected direct from the motor pulley to the pulley on the wheel head, a 7½-horsepower motor is ample and in some cases 5 horsepower has proven entirely satisfactory.

Operating Speeds.

To the adoption of the safety collar is accountable economical operating conditions more than to any other factor, in that it has enabled the adoption of speeds which bring results with safety. The practical safe limit for running abrasive wheels with straight sides is 5,000 feet per minute peripheral speed, and even then it is quite hazardous unless these wheels are carefully protected with hoods. With the safety collars properly used, one can operate more safely at 6,500 feet per minute peripheral speed than to operate the straight wheels at 5,000 feet, with the additional advantage of an increased output. Those operating in accordance with these suggestions will secure the highest degree of efficiency obtainable in foundry work, and the writer's experience has been that 6,500 feet has proven to be the most economical speed at which to run.

Cup Wheels.

The use of cup wheels, sometimes called tub wheels, should, at all times, be avoided. They are the most dangerous of abrasive wheels and in their stead, where it is necessary to do face grinding, a good substantial chuck should be used, with a cylinder wheel which has no back. It is apparent that a cup or tub wheel, which, for instance, may be 12 inches in diameter, 6 inches high, with 2 inches, or more, thickness of rim and a back 1 or 1½ inches thick, that the centrifugal strain of this heavy rim pulling on lighter binding point, compels the running of these wheels very slow to keep within any reasonable lines of safety. Were this made without the back, and the cylinder completely surrounded with an adjustable chuck whereby the wheel can be fed forward as worn, a higher speed might be maintained with perfect safety. A cup wheel should not be run more than 3,500 or 3,800 peripheral feet per minute, depending on the thickness of the rim, whereas a ring wheel may be run approximately 5,000 feet per minute.

Testing Plant for Concentration of Magnetic Ores.

The mines branch of the department of mines of the Canadian government is installing an experimental testing plant in Ottawa for the concentration of magnetic ores. When completed, the plant will consist of a standard Grondal concentrating unit, comprising an ore crusher, ball mill, and two Grondal magnetic separators operating in tandem; the capacity of the plant being from two to four tons of crude ore per hour.

The plant is being installed for the purpose of testing low grade magnetic iron ores and sands, with the view of proving their amenability to concentration by the Grondal wet system. Tests will be carried through for the determination of the following points:

(1) Extent of crushing required to raise the iron content of the crude to 65-70 per cent, in the concentrate.

(2) Extent of crushing required to depress sulphur, phosphorus, or titanium content to percentages acceptable to furnace men.

(3) Number of tons of crude that are required to produce one ton of concentrate.

(4) Power consumed per ton of crude oil concentrated.

(5) Cubic feet of water used per ton of crude ore concentrated.

It is expected that the plant will be ready for operation about the first week in November, 1910. Tests will be made free of charge on Canadian ores, but it is required that shipments shall be delivered carriage paid at the testing plant at Ottawa.

Shipments of ore for testing purposes should not be less than five, nor more than 20 tons; and it is particularly requested that shipments be made in bags containing not more than 100 pounds of ore, to facilitate handling. Communications should be addressed to Dr. Eugene Haanel, director.

New Catalogs.

POWER PLANT APPLIANCES.—The Sims Co., Erie, Pa., has issued bulletins G-2 and G-C-2, describing its hot water generators and converters and presenting tabulations of dimensions, capacities, etc.

AUTOMATIC SCREW MACHINES.—A handsome 24-page, 9 x 12-inch catalog has been issued by the National Sewing Machine Co., Belvidere, Ill., describing its automatic screw machines for forming, drilling, reaming and threading parts from rod stock.

CENTRIFUGAL PUMPS.—A 96-page, 6 x 9-inch catalog comes from the De Laval Steam Turbine Co., Trenton, N. J., describing centrifugal pumps in single and multiple-stage types, with a discussion of the principles of design and remarks on the selection of pumps for various services.

RADIAL DRILLS.—The Fosdick Machine Tool Co., Cincinnati, O., has issued a 40-page, 9 x 11-inch catalog devoted to the Fosdick radial drills, plain and universal, both belt and motor driven, and the Fosdick horizontal boring, drilling and milling machine.

THE MECHANIGRAPH.—From Topping Brothers, 122 Chambers street, New York, comes a booklet devoted to a description of the mechanigraph, which is described as a machine which, in a single instant, makes transparent and printable a pencil or pen drawing on any paper, no matter how heavy or opaque, and which ought to be of very great interest to all who are interested in the making or using of drawings for reproduction.

NUTS.—An exceedingly neat little 43-page catalog comes from the Brightman Mfg. Co., Shelby, O., descriptive of cold finished nuts.

WIRE MACHINERY.—The F. B. Shuster Co., New Haven, Conn., has issued a booklet descriptive of its automatic wire-straightening and cutting machines and elastic rotary blow riveting machines.

A NEW AUTOMATIC ANNEALING FURNACE

An Ingenious Apparatus Which Weighs, Anneals and Delivers Material Without Manual Assistance

An automatic furnace for annealing, at low or high temperature, small castings or stampings of iron, steel or bronze, has recently been designed by Cliff M. Bleyer, manager of The Hawley Down Draft Furnace Co., Chicago. This furnace, which is shown in the accompanying illustrations, has a number of interesting and original features. It is entirely automatic in operation, being self-feeding, self-distributing and self-discharging. When provided with a supply of materials and heated to the proper temperature, it does its work practically without attention and delivers the annealed product to any point desired within any reasonable distance, half a mile, if necessary, from the furnace. All that is needed for the operation of the furnace is a suitable supply of oil or gas and an ordinary 110-volt electric circuit, either alternating or direct current.

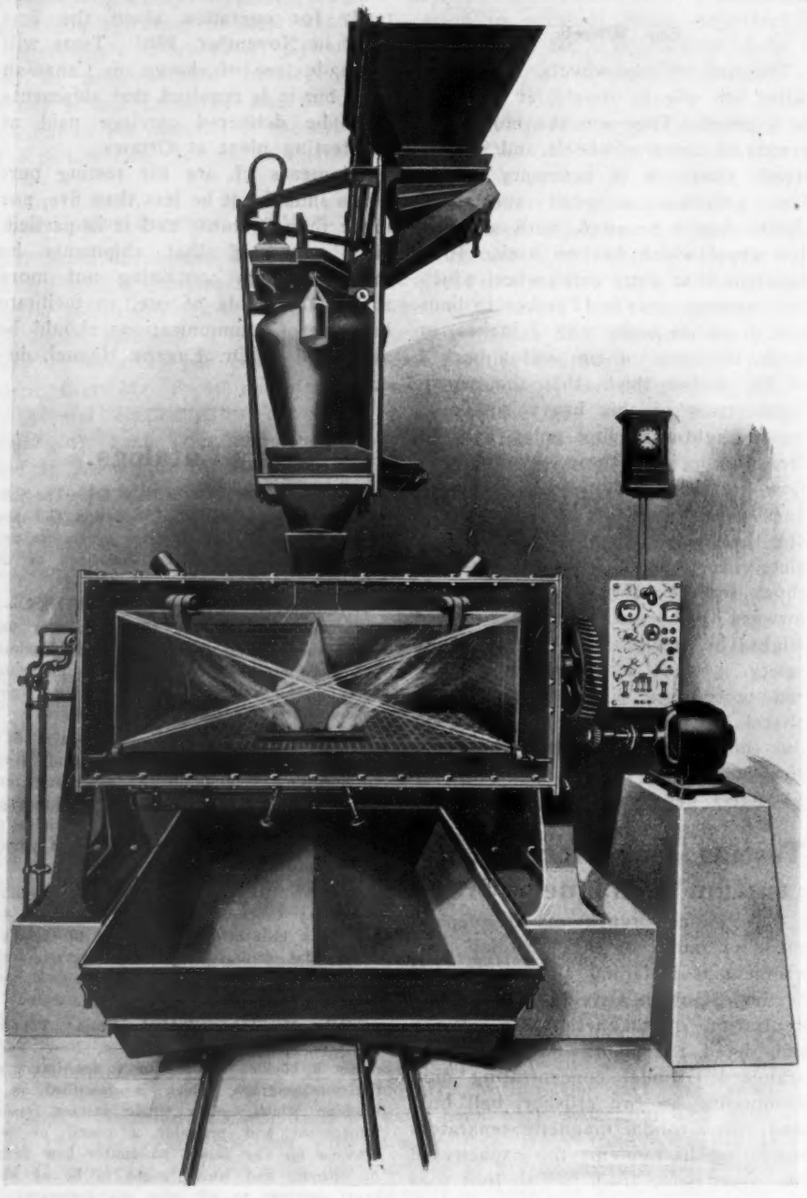


FIG. 1—FRONT VIEW OF AUTOMATIC FURNACE SHOWING DISTRIBUTING WALL.

The furnace consists of a rectangular box-shaped shell made of six heavy cast iron plates and lined with fire brick. The thickness of the fire brick lining varies from 4 to 8 inches, depending on the size and capacity of the furnace. The furnace illustrated is 6 feet in length and 3 feet square, in section, the thickness of lining being about 5 inches. This furnace is designed to handle 200 pounds of small castings in one charge. Between the fire brick and the cast iron shell is a sheet of asbestos felt ½ to ⅞ inch thick, depending on the size of the furnace. This non-conducting sheath reduces the radiation from the furnace to a minimum and consequently tends to maintain a high internal temperature.

The furnace is carried on trunnions, which are connected to a train of gears by which the furnace is tilted. The plates of which the shell is composed are bolted together, but any one can be removed and replaced without disturbing any of the others or without taking down the entire machine. To remove the end plates, the machine is either jacked off the trunnions or lifted with a chain sling swung from a traveling crane. After the furnace has been removed from the trunnions either end plate may be taken off with ease.

Heat is supplied by two oil or gas burners through the bottom of the furnace, as seen in Fig. 1, and which may be regulated independently. These burners are provided with flexible connections and move with the furnace when it is tilted.

How Distribution is Effected.

One of the important features of the design is the arrangement of the brick inside of the furnace, as shown in Fig. 1. Directly under the charging hole is a wedge-shaped dividing wall of fire brick, which deflects the charge and distributes it evenly over the bottom of the furnace.

The slope of the deflecting surfaces is so arranged that the castings slide down easily and drop lightly to the bottom of the furnace without injury or breakage. The lower part of the deflector is cut away as shown, so that the flame entering from below on either side is directed towards the ends of the furnace, but does not come in direct contact with any of the pieces being annealed.

Above the furnace is a large supply hopper which is filled either by a conveyor or from the room overhead, or any other suitable means. This hopper is fitted with a valve in the bottom, operated by a solenoid controlled by an electric clock, and may be of any convenient capacity from one to one hun-

dred tons. Between the hopper and the furnace is an automatic scale made by the Richardson Scale Co. The method of operating the furnace is as follows: At a predetermined time the clock, through the solenoid, opens the valve in the hopper so that the castings or materials to be annealed discharge on to the automatic scale. The scale is also arranged in connection with the solenoid so that when a given weight of material has been discharged the hopper is automatically closed and the charge is dropped from the scale into the furnace and is evenly distributed over the furnace bottom by means of the fire brick deflector described above.

The Tilting Mechanism.

After the charge has been in the furnace a certain length of time, which time is adjustable at the will of the operator, the electric clock starts the tilting motor, which tilts the furnace to an angle of 45 degrees, first in one direction and then in the other. In this way the material is automatically shuffled without manual labor and is heated on all sides uniformly.

At any other predetermined time, after the furnace is charged, the electric clock again operates the tilting motor, only in a different manner. This time the furnace tilts forward and the door is opened, as shown in Fig. 2, dumping the entire charge into the truck, which is shown beneath the furnace. This truck is also operated by a motor, which starts 30 seconds after the furnace door is opened and carries the annealed material any distance that may be desired, into another room or to another part of the plant. The action of the truck in leaving its station reverses the tilting motor, whereupon the furnace rights itself and closes the discharging door. It then receives another charge of metal from the scale and the cycle is repeated.

In the meantime the truck reaches the end of its journey and dumps the charge of metal automatically at the designated place, for instance, in the stamping room. After dropping its load, the truck reverses and goes back to its place under the annealing furnace, where it awaits the second charge.

The Electrical Equipment.

To insure the successful automatic operation of the furnace as outlined above, considerable ingenious electrical apparatus has been designed by the General Electric Co. As stated, the motor is stopped and started at the proper time by an electric clock. This control is effected as follows: An electrically-operated switch is placed in the main motor circuit and two auxiliary circuits are used to operate this switch, one to close it and the other to open it. The auxiliary circuits are energized by the clock, which is provided with rotating contacts that effect the proper electrical connections. The tilting operation is also automatic once the clock has started the motor. As the furnace reaches the 45-degree point, a mechanically-operated limit switch is thrown which, by means of an auxiliary circuit, operates a pole changing switch, thus reversing the motor. When the furnace is ready to discharge, the clock sets the tilting motor in operation by means of a separate circuit so that the limit switch at the 45-degree point will be dead and will not reverse the motor, but will permit it to continue in motion until the furnace has been tilted 90 degrees, to the discharge position. At this point another limit switch opens the main circuit and stops the motor. The motor on the delivery truck is started by the electric clock, but the truck is stopped and reversed by mechanical limit switches. As previously stated, the tilting motor is started and the furnace righted after discharging by the action of the delivery truck in leaving its station under the furnace. This control is also effected by limit switches operating the main motor control through an auxiliary circuit.

It is seen from the foregoing description that the operation of the furnace is entirely automatic. The device requires no attention whatsoever other than an occasional inspection and oiling and a glance at an electric thermometer, which records the furnace temperature. This thermometer may be placed at any convenient point in the furnace room, or even in another part of the building. The furnace may be operated day and night without pause for months.

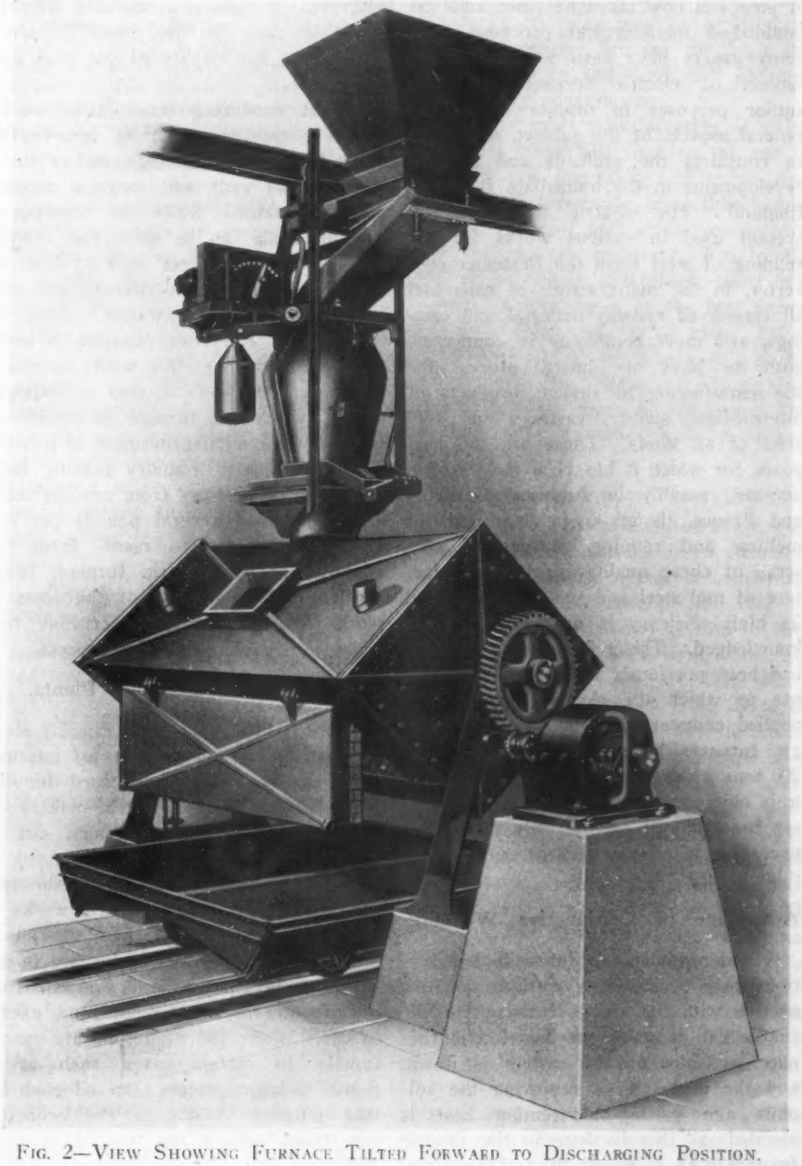


FIG. 2—VIEW SHOWING FURNACE TILTED FORWARD TO DISCHARGING POSITION.

The Colby Academy, New London, N. H., is contemplating the erection and equipment of a power plant.

ELECTRIC STEEL REFINING

A Discussion of the Influence of the Electric Furnace on the Manufacture of High Grade Steel

By D. F. Campbell.[2]

The use of electricity for the refining of steel has now taken its place amongst established metallurgical processes, and many papers have been written on the subject of electric furnaces, but the author proposes to discuss briefly the general aspects of the subject, and what he considers the probable and possible developments in the immediate future in England. The electric furnace is at present used in various works for the refining of steel from the Bessemer converter, in the manufacture of rails and all classes of railway material and castings, and more commonly in connection with the basic open-hearth process for the manufacture of various products of intermediate quality, castings and tool steel of all kinds. These are the purposes for which it has been most widely adopted, notably in America, Germany and France, though it is also used for melting and refining charges of cold scrap of cheap quality for the manufacture of tool steel and small castings, and its high efficiency is now generally acknowledged. The refining of steel that had been previously melted was the first use to which the electric furnace was applied commercially; but now that single furnaces have been producing over 200 tons a day for more than 16 months, it is obvious that the field for the process has widened, and already many furnaces are in construction or operation in this country.

Advantage of Conjunctive Working.

A wider application for rails and sections may occur when working in connection with the Talbot furnace, for the charge can be taken to the electric furnace as soon as the carbon is down, and the necessity of removing the sulphur and getting a teeming heat is avoided, as this is done in the electric furnace both economically and completely. Thus the capacity of the Talbot furnace is substantially increased, and this covers the greater cost of electric refining.

Again, in the case of a basic open-hearth plant, using 60 per cent of molten pig iron and 40 per cent of scrap, a 40-ton furnace might have 15 tons removed to the electric furnace for refining, and a similar charge put in every two hours. Thus the capacity would be increased, the quality improved, and, in addition, a reduction in the cost of raw materials can also be made in some cases, as a low quality of pig iron can be used.

Similar conditions occur when working in conjunction with an open-hearth plant for making castings, and a thoroughly dead melt and extreme fluidity can be obtained, while the commonest raw materials can be used, and refined completely. This gives economy both in the amount of gits and runners, and also in the reduction of waters. Even in the case of foundries engaged in ordinary open-hearth casting work, in which the margin of profit is now exceedingly small, the electric furnace is considered necessary for an improvement in quality, while in a small foundry making light and intricate castings from crucible steel, an economy of several pounds per ton may be expected to result from the adoption of the electric furnace, judging from the reduction of the costs in works in Germany where crucible furnaces were replaced by this process.

Salvation of Bessemer Plants.

There is little doubt that crucible steel, Swedish billets and products of intermediate quality, such as are used for the Sheffield trade and by tube-makers of Staffordshire and South Wales, can be economically replaced by steel refined by electricity, and made in Middlesbrough, Cumberland or the larger steel works in the Sheffield and Rotherham districts.

The use of the electric furnace is not likely to become general for rail steel manufacture at the present time, except in cases where the conditions are exceptional. In certain cases, such as at South Chicago, it has been adopted for that purpose, owing to the economic conditions, notably the scarcity of good Bessemer ores and the demand for better rails. The electric furnace in such cases may save Bessemer plants from the scrap heap, or, at any rate, prolong the life of present installations, and at the same time make it possible to produce rails of a quality better than the best open-hearth steel, thus avoiding heavy capital expenditure.

In the electric furnace, almost any degree of refining can be economically effected, and the removal of sulphur, phosphorus, and oxygen is especially easy. This is probably due to at least three causes:—

1. The intense heating of the slag, which is the place at which refining takes place. Owing to this high temperature and the extreme fluidity of the slag, the rate of the refining reaction is very great, because the velocity of reaction rises very quickly for high temperatures, and not in direct proportion to the temperature.

2. The extremely basic slag that can be kept in a very fluid state, and the calcium carbide formed by the action of the arc on the calcareous slag, are especially advantageous for desuphurization.

3. The violent motion of the steel, which results from the convection currents produced in the bath, due to the two intensely hot areas caused by the arcs below the electrodes, increases the volume of steel exposed to the hot and fluid slag area, and hence the rate of refining.

Rarity of Blow Holes.

The usual procedure for the use of the electric furnace in connection with the Bessemer converter is to charge the steel, holding back all slag in the ladle, after putting on the bottom of the furnace, lime and mill scale or iron ore. This produces an oxidizing or dephosphorizing slag, which may be carefully skimmed or poured off. On the bath of steel carbon is thrown to carburize to any required degree, and then a second highly basic and desulphurizing slag is added. The arc acting on the calcareous slag produces calcium carbide, which may combine with sulphur to form calcium sulphide. As neither gases nor air enter the furnace, and the conditions are almost completely reducing, no sulphates are formed, a dead melt is easily obtained, and when the slag is molten and the requisite heat obtained, the steel is teemed. In the open-hearth or any oxidizing furnace these reactions cannot take place so completely and efficiently.

With steel from the basic open-hearth furnace, the procedure is similar, but when the quantity of phosphorus to be removed is small, it is only necessary to use one refining slag for the elimination of sulphur and any small amount of phosphorus remaining. The usual practice is to put the carbon necessary for carburizing in the bottom of the furnace and then add the steel, and the basic slag materials. As soon as the teeming heat is obtained, the necessary ferro-alloys are added and the steel will be completely refined.

Another point of interest is the rarity of blow-holes in electric steel when properly made, and this leads to the question

[1]Paper presented at the September meeting of the Iron and Steel Institute.
[2]London.

of the cause of these troubles. It is well known that any ingot of steel when placed in a vacuum evolves nitrogen, and this is about equally true whether it be made in the crucible, the Bessemer converter, or the electric furnace. Blow-holes contain nitrogen, but this is probably not the cause. It is far more probable that they are due to the combination of oxides with the carbon in the process of cooling, and that the carbon monoxide so formed at a high temperature causes blow-holes in the cooling steel, and, owing to the diminution of volume of the carbon monoxide on cooling, a partial vacuum is formed, and nitrogen is sucked into the blow-holes. In electric steel, oxides do not occur in any quantity, and consequently the prime cause of blow-holes is reduced.

Again, the quality of electrically refined steel is better than a material of similar chemical composition made in any oxidizing furnace. This is probably due to the reducing conditions under which it is finished.

Cost of the Process.

It must not be forgotten in discussing these special qualities of electrically refined steel, that some inferior material has been made by incompetent melters or in ineffective furnaces, and that the electric, just as much as any other furnace, requires trained men, and most careful designing by metallurgists who have made a special study and had practical experience in this subject.

The question of the cost of applying this process, which must be considered before all others, is more difficult to discuss generally, owing to the great variety of conditions. The following are the chief points, all of which must be carefully considered in each particular case:—

1. The possibility of saving in cost of raw materials, since the best qualities of steel can be made from impure raw materials. For example, in the case of refining steel from open-hearth furnaces in the South Staffordshire district, the use of local pig iron as compared with hæmatite iron would effect a saving of several shillings per ton, owing to the high railway rates.

2. Possibility of increasing the output of present furnaces by the addition of electric furnaces with improvement of product. For example, in the case of Talbot and other open-hearth furnaces, where a large expense is incurred in the removal of sulphur and getting a teeming heat, the steel can be advantageously transferred to an electric furnace for desulphurization and the output materially increased. The Talbot or other tilting furnace is especially satisfactory, owing to the facility with which charges can be transferred to the electric furnace, whenever required.

3. The cost of power and possibility of using blast furnace or coke-oven gas, exhaust steam, etc., will be the determining factor in regard to deciding whether, in the manufacture of steel, electric refining can be economically adopted. In the case of cheap power or valuable products, scrap may be economically melted and refined in the electric furnace at a current consumption of 700 to 800 kilowatt hours per ton, or if the price of power be high, the steel may be merely desulphurized and deoxidized, after melting and dephosphorizing in a basic furnace, with a power consumption of 100 to 150 kilowatt hours per ton.

4. The possible reduction of capital expenditure at certain works where the present products are not sufficiently good for modern specifications. This may involve the entire re-organization of the works, but it is often cheaper and more efficient to add an electric furnace to a Bessemer plant, than to replace the latter by open-hearth furnaces.

The Features of Best Design.

The author does not wish to compare the different types of electric furnace in this paper, but the figures given are taken chiefly from Heroult furnaces in America, England, Germany, and France, as this type has been far more widely adopted, and is used in larger units than any other, and single furnaces are now refining 250 tons per day. This furnace is similar to a basic open-hearth furnace, and seems to present more simplicity and to embody more of the desirable features of electric furnace design than any other, which, in the author's opinion, are:—

1. The best basic open-hearth design should be followed as closely as possible. A bottom homogeneous and solid and banks free from embedded electrodes is important, and above all, simplicity of design.

2. All electric mechanism, in the form of generators, transformers, etc., should be entirely separate from the furnace, should work under ordinary conditions of standard electrical practice, and should be of standard design, so as to avoid all unnecessary risks and complications.

3. A high power factor must be maintained, thus reducing the capital cost of machinery, and increasing the general efficiency of the power house.

4. To avoid excessive cost of refractory materials, the roof should be protected from the direct radiation of the arcs by the electrodes themselves, and the intensely heated area of slag should be as large as possible, to increase the surface of refining action. The Heroult furnace has an advantage over the open-hearth furnace in that the heat is applied to the center of the bath, so that the banks are not quite so hot as the middle of the furnace and the wear of refractories is consequently less.

5. The heat should be applied to the slag, as in the basic open-hearth furnace, and the temperature of the slag should be maintained above that of the steel, which allows of extreme basicity and fluidity being obtained and gives an intensely active refining action. The conditions in the furnace should be oxidizing, neutral or reducing, at will.

The adoption of electric refining will cause some readjustment in the steel trade. As soon as the Sheffield steel melter has become acquainted with the process, and accustomed to the working of electric furnaces, electrically refined steel will largely replace ordinary crucible steel. This has already occurred in Germany and America, where electric furnaces are used to make all classes of special and high-speed steels, the usual practice being to refine metal from a basic open-hearth furnace. Large crucible plants and small open-hearth furnaces engaged in the manufacture of small and intricate castings, such as motor car parts, etc., may be replaced by electric furnaces, because the high degree of fluidity and dead melt obtained is especially advantageous.

In many cases manufacturers of axles, guns and tubes will abandon the use of Swedish raw materials, and refine steel made from low-grade ores, thus reducing the value of high-grade ore deposits and the quantity imported; for, by the use of electricity, Cleveland stone will produce a steel equal to the best hæmatite ores. The capacity of many Talbot and basic open-hearth plants will be increased and the quality of the product improved, while much of the power that is now going to waste will be utilized for steel refining.

A Desirable Power Plant Load.

From the electrical engineer's point of view, the electric furnace is an attractive load, as it is more or less in continuous operation. In the case of the Heroult furnace the power factor is 0.88 to 0.90, though much less with large induction furnaces. Single, two or three-phase current of any frequency from 20 to 60 has been used without any difficulty, though it is preferable in the case of a two-phase system to transform to three-phase current, which can be done without additional difficulty or expense. The load factor will be most favorable, the usual practice when refining, for example, in a 15-ton furnace, being to use 2,000 kilowatts for 20 minutes after charging, while the steel is being heated. The current is then reduced to about 1,500 kilowatts for 45 to 75 minutes until the steel is ready for teeming. There is then an interval of ten to fifteen minutes during which the furnace is teemed, fettled and charged, which allows the transformers or generators time to cool before the period of overload commences. Current fluctuations occur for a few minutes, while there is an evolution of gas from the steel which makes the bath boil up and touch the electrodes. This, however, is not sufficient to be objectionable, provided that the electrical machinery is properly designed for the purpose, and the extent of these variations is not so great as in the case of many rolling mills, the fluctuations in voltage being only about 3 per cent in the South Chicago works, where a 2,000-kilowatt furnace has been working steadily since May, 1909.

SAFETY IN HARDENING LARGE DIE BLOCKS

A Method of Handling Which Avoids Risks and Produces Uniformly Satisfactory Results

By C. U. Scott.

The question "is there any safe and sure method of hardening large dies?" has often been asked. By this term is meant drop hammer dies weighing from ten pounds to six and seven hundred pounds.

The first consideration entering into the safe hardening of large die blocks is some reliable and quick method of handling them. If a 700-pound die is to be hardened it would require a very expensive pair of tongs and several men if the block were to be handled by sheer strength alone, hence it is considerably less expensive, even in the first instance, to properly prepare for the handling of these large blocks.

The proper equipment for handling large dies consists of a chain block arranged on a sweep crane or trolley-way so that the dies can be swung or run from the furnace to the tank directly over the stream of water. Next, there should be a 25-32 inch hole drilled 2 inches deep in the ends and center of the die. The holes can be drilled below the center if desired so as not to come in the way of the impression in the die as it is reduced in size by working over or resinking, some die blocks being worked over as often as six or eight times, reducing their height to less than half of the original, in which case it is necessary to have the two holes below the center. Next, it will be necessary to have tongs for all the smaller sizes, including 6-inch blocks. For sizes above 6 inches, one pair of ice tongs such as shown in Fig. 1, will answer for all up to 2 feet in length or any length that can be rotated in the tongs. In addition it is necessary to have a pair of ordinary tongs for turning the die while suspended in the tongs.

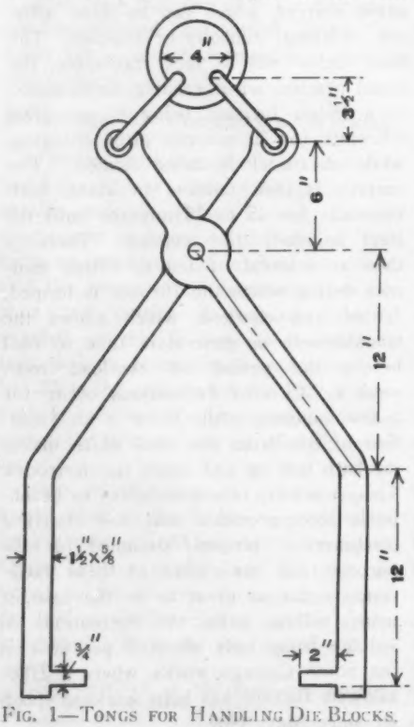


Fig. 1—Tongs for Handling Die Blocks.

The next important appliance is a suitable furnace. The one shown in Fig. 2 can be built by the average machine shop, keeping the size in accordance with the work to be done. This furnace is intended for natural draft; anthracite coal and charcoal being used as fuel. The fire is kindled in the ordinary manner and at the close of the day's work, it is fired with anthracite coal, sufficient draft being left on over night to have the furnace hot and ready for work next morning. This is accomplished by regulation of the upper damper. In preparing the fire for the day's work, all the ashes are stirred through the grates into the ash pit, after which the fire is leveled off and from 2 to 4 inches of large sized charcoal is spread over the entire surface. This is allowed to burn until entirely red. The fire is then again entirely leveled and plates of ½ x 5-inch mild steel placed over the top and within 1 inch of each other to form a floor for the work. As soon as the plates have reached a red heat, the furnace is ready to be filled with work. Where the natural draft is not strong enough to operate the furnace, an air pipe may be connected into the flue beyond the damper, and, by turning on the air, sufficient draft can be had to almost melt the steel, hence the air must be used sparingly.

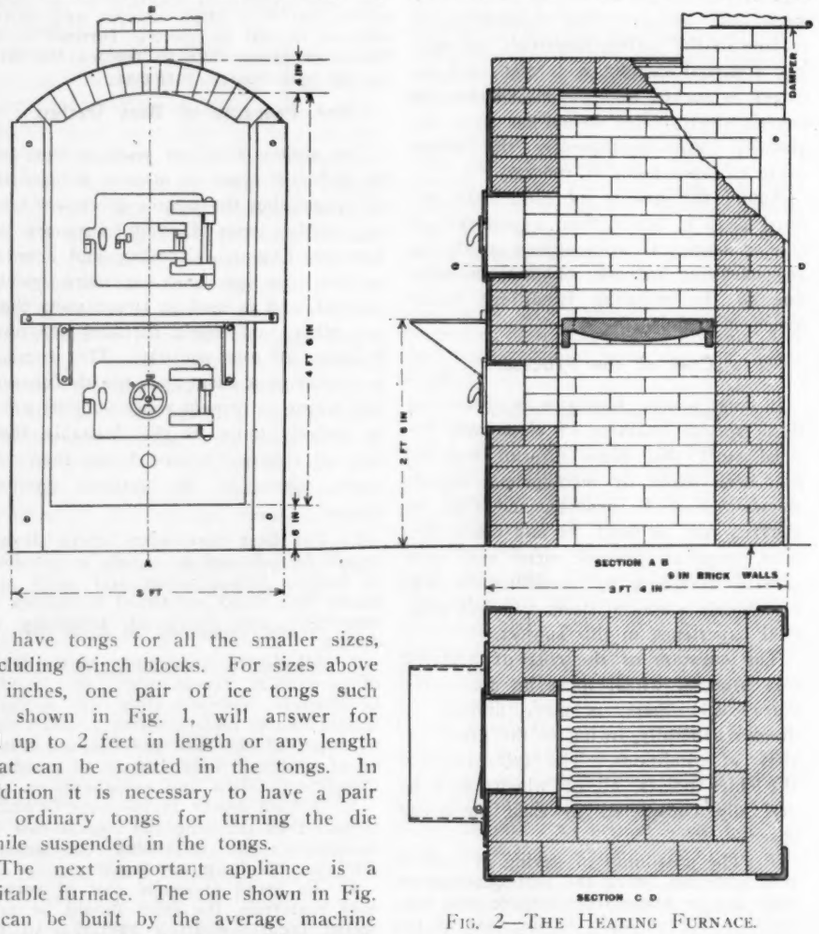


Fig. 2—The Heating Furnace.

We will consider next the cooling tank and its accessories which will complete the equipment. While there are a great many dies lost from improper heating the percentage is very small compared with the loss from improper cooling, hence it is as necessary to have a properly designed cooling tank as tongs or furnace to insure absolute safety. The tank shown in Fig. 3 represents all that is required for convenience and safety. This tank is 48 inches wide, 72 inches long and 28

inches deep and should be lined throughout with No. 17 galvanized iron. In order to insure the safe handling of large dies it is necessary to have the water on entering the cooling tank at a temperature of from 70 to 80 degrees Fahr. with the arrangement of pipes shown in Fig. 3. It will be seen that this is accomplished by connecting a 1-inch steam pipe directly into the water supply on a line with the outlet and by proper regulation of the flow of steam, water of any temperature can be had. Having now considered the entire equipment with the exception of a few minor pieces, which will be referred to later, we will now turn to the annealing, which, to a considerable extent, governs the general results.

Careful Annealing First Requisite.

The very first and most essential operation is the annealing of the block before planing into shape for the die sinker. Great care should be used in getting an even temperature. If one part of the die is hotter than another when placed in the annealing box, there will be two different grains in the steel, due to the uneven heat, and as the annealing heat is usually (and unnecessarily) higher than the hardening heat, there is but little hope of having a uniform die (if by chance it is not lost in the hardening), and as it is the purpose of this poper to describe a method whereby a drop-hammer die can be hardened with absolute assurance that it will be in one piece with all corners intact, it is necessary to have every operation performed with some degree of uniformity and as the annealing is one of the very important operations, it will also be considered.

How Annealing Should be Done.

To anneal a die block it should be placed in a fire having a heating chamber from 4 to 6 inches larger than the block to be annealed. The heat should be brought up in a moderate length of time; if the block weighs 50 pounds the time for heating should not exceed 2½ hours, if 700 pounds, it should not exceed 5 hours, but in either case the heat of the furnace should not be raised higher than is desired for the annealing and should not go beyond 1,480 degrees Fahr. As soon as the die reaches this heat throughout, it should be removed from the fire and placed in air-slacked lime to cool. To leave a die or a piece of steel in the furnace to cool, means that it will be short and not at its best, as there is not only nothing to be gained by soaking or prolonging the heat, either for annealing or hardening, but direct injury results. We are able to say that the quicker steel is heated, the better it will be, but in applying the heat the steel must not be subjected to more than is ultimately required for the annealing or hardening heats.

In heating for hardening, we first take the die in the ice tongs and swing it onto the shelf of the furnace (the fire having been prepared as described above), we then turn the die placing one end in the furnace. Then we place a piece of 1-inch gas pipe under the end in the fire. Here we find use for the holes in the end of the die. These holes will also be a convenience for their handling in the die room as well as in the forge shop. We place one end of a ¾-inch round bar, 5 feet long, in the hole in the outer end of the die and by lifting lightly the die can be easily placed in position for heating. The pipe is then removed and the die allowed to rest on the iron plates. If the die weighs from 450 to 500 pounds it will require about four hours to heat, and if the fire is properly cleaned, it can be heated without turning, but the heat must be uniform even if the die must be turned, which can be done with the bars through the small opening of the furnace. When the heat is almost ready to be taken we turn to the tank and arrange the flow of water for the hardening. There should be at least a 1-inch stream of water and connected into this a 1-inch steam pipe. The amount of steam required will depend upon the temperature of the water, but sufficient steam should be used to take the chill off the water. While I gave the temperature as from 70 to 80 degrees Fahr., it will not be necessary to use the thermometer, as we all know what is meant by removing the chill (or lukewarm water), and as long as the supply is between the above temperatures it will be all that is desired. Here I wish to state that dies can be hardened very nicely with steam, not using the water supply at all, if the steam and water pipes enter the tank as described above. Have the water flowing at the proper temperature. We next regulate the height of the water in the tank by valve *A*, Fig. 3 (which we will consider as being in the front end of the tank), opening it until there is not more than ¾ to 1 inch of water above the iron bars on which the die rests while being hardened. This is very important and must be held within that range with some exceptions which will be described in the cooling.

The heat being uniform and sufficient to harden, the die is again raised with the bar and the roller put in place. The die is then drawn out of the fire and allowed to rest on the shelf, when it is grasped by the ice tongs. As the die is about to be lifted by the chain block, it is grasped by another light pair of tongs in order to keep the face of the die up. We are now ready to quench for hardening. We swing the die over the front end of the tank where there is room to immerse the die to 1/3 of its height (on the shank side). We allow the shank of the die to remain in the water from 30 to 60 seconds, according to the size. The smaller and thinner dies do not require as much as 30 seconds, but sufficient cooling must be done to govern the contraction expected. Having cooled the shank, the die is lifted to a sufficient height to permit it being turned without striking the water. Before turning, however, the die should be wiped with a wet swab, being sure to take out any surplus heat left in the projections, cor-

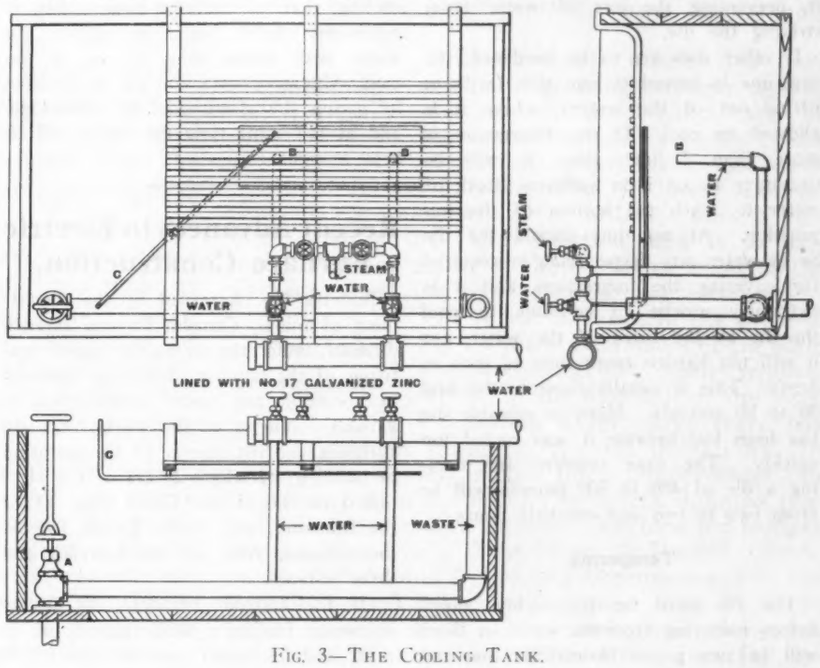


FIG. 3—THE COOLING TANK.

ners and high places. After turning the face of the die down, it is moved directly over one of the pipes *B* (if the die is long both pipes may be used) and within 1 inch of the surface of the water. The plate is then drawn from over the top of the pipes *B* and *B*, by means of the lever *C*, allowing the water to strike the die instantly. At the same instant the man at the chain blocks lowers the die into the water until it rests on the bars which will allow the die to rest in ¾ to 1 inch of water. The tongs are then removed to one side and sufficient water is thrown on the shank to keep it black. We allow the die to remain in this position from 30 seconds to two minutes, after which the plate is again thrown in place over the pipes *B*, preventing the jets of water from striking the die.

If other dies are to be hardened, the first one is moved to one side (without lifting out of the water), where it is allowed to cool. If the impression is more than 1 inch deep it will be necessary to set it in sufficient depth of water to reach the bottom of the impression. At no time should the die be in water any deeper than is required for covering the impression, and it is extremely unwise to continue to cool the die by the force of the water, for it will not harden more than ¼ inch in depth. This is usually done in the first 30 to 80 seconds. Many a valuable die has been lost because it was cooled too quickly. The time required for cooling a die of 450 to 500 pounds will be from two to two and one-half hours.

Tempering.

The die must be thoroughly cooled before removing from the water or there will be two pieces instead of one and it is advisable to test it with the palm of the hand, or better still, with the fore arm. When found sufficiently cool, the die is once more caught with the tongs and returned to the furnace. This time, however, it is placed in the ash pit with the face up. A thin plate is then placed over the top and after 15 minutes, the plate is removed and the die allowed to remain for 15 minutes more. By this time it should be sufficiently warm to boil water, which is sufficient to relieve the strain and do good work. However, if the temper is to be drawn to a straw or blue, the die is removed and roughly polished and returned to the furnace. This time it can be placed in the heating chamber instead of the ash pit, but, if there is sufficient time, the die will draw to any desired temper in the ash pit.

While it has taken a great many words to thoroughly explain the above method, yet it is simple and can be followed by anyone. The writer has a record of hardening 2,720 drop hammer dies without the loss of one and has heated and hardened one hundred 4 x 4 x 4-inch die blocks in eight hours with an equipment precisely as described above, using two furnaces for the heating, besides having fourteen other furnaces to operate in addition.

I was at one time of the opinion that the steel maker was responsible for at least 90 per cent of the losses in hardening; I am of the opinion today, however, that he is not responsible for 2 per cent. The essential point to be observed in hardening is to cool no more than is absolutely necessary. If we have a piece as hard as is necessary, why continue to cool? It is much better to stop a little short with the force cooling, than to continue longer than is necessary. It is better to agitate the water with steam than to use it too cold. Uneven contraction can be avoided by giving the short side the advantage, and at the same time the work will be kept straight.

Recent Advances in Electric Furnace Construction.

Bulletin No. 3, issued by the department of mines, Canada, Eugene Haanel, director, under the above title, gives statistics of the number of electric furnaces in operation and under construction in various countries of the world. Of arc furnaces the list shows 77 in operation or building, of which 29 are of the Heroult type, 17 of the Girod type, 13 of the Stassano, six of the Keller, five of the Chaplet, four of the Ludvika and three various.

Of the Heroult furnaces, 18 are in operation, having a total capacity of 88 tons, and 11 under construction of 57 tons.

Of the Girod system, there are nine in operation, with a capacity of 50 tons, and eight under construction with a capacity of 32 tons.

Of the Stassano type, the five in operation have a total capacity of five tons, with one 1-ton furnace under construction. There are seven idle of 15 tons capacity.

There are four Keller furnaces operating, with a capacity of about 15 tons, and one under construction of 5½ tons capacity.

Of the Chaplet system there are four in operation, of about 19 tons capacity, with one 5½-ton furnace under construction.

The two Ludvika furnaces in operation have a capacity of about 3,300 pounds, with two building of about 7 tons capacity.

The remaining three furnaces have a total capacity of a little over one ton.

Of induction furnaces, there are listed 35, of which 14 are of the Kjellin type, 15 Rochling-Rodenhauser, two Kjellin-Colby, one Frick, one Schneider, one Kjorth and one experimental.

Of the Kjellin, there are 10 in operation, with a capacity of 22 tons, two idle and two under construction of 3½ tons capacity.

Of the Rochling-Rodenhauser, there are six in operation, with a total capacity of 28 tons, one idle and eight under construction of 19 tons capacity.

Of the remainder, the largest furnace is on the Frick system, at the Krupp Works, of 11 tons capacity.

There are also listed two combined arc and induction system furnaces under the Nathusius system, of 6 tons total capacity.

With regard to iron ore smelting furnaces, the bulletin details at considerable length the progress which has been made in Sweden and with reference to the electric shaft furnace at Domnarfvet, Sweden, described in THE IRON TRADE REVIEW of Sept. 30, 1909, quotes a communication from A. Gronwall, one of the inventors of the Domnarfvet furnace, as follows:

"We are glad now to be able to inform you that we have had a very fine success these last months with our electric shaft furnace. The furnace in Domnarfvet was put to work again on March 1, without having been rebuilt. Consequently the furnace is still made for 800 horsepower. The only alteration being made, was by introducing the circulating gas around the electrodes, inside the water-cooled boxes. By this device, the loss of heat, which had before arisen through the heating of the water, is prevented; since the gas absorbs a good deal of heat which is now being led down into the furnace. Further, the water jackets are now made of a non-magnetic material, which prevents a considerable loss of electric energy. As a consequence, the output has been increased to such an extent that now, by a charge of 55 per cent Fe—when producing gray iron—6,283.11 pounds pig iron per horsepower year is obtained; and when producing white pig iron, 6,613.8 pounds per horsepower year. The furnace has been continuously working, and acts satisfactorily."

It is stated that two more shaft furnaces of the Domnarfvet type for the reduction of iron ore, each of 2,500 horsepower capacity, and two steel refining furnaces of the resistance type, each of 600 horsepower capacity, together with a rolling mill, are to be established at Tysse, Norway.

The fire brick plant of the Harbison-Walker Refractories Co., located near Corey, Ala., is being enlarged. It is the purpose of the company to increase the capacity about one-third. The capacity of the plant today is about 40,000 hand-made brick; and the plant is the most modern one built by the company in any section of the country.